D51B-2U

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A.2 Explanation of Node

A.2.1 Front side

A.2.1.1 Front side of a node

Figure A.2.1.1-1 shows the front side of a node.
When there is an instruction to press the power source button, press Power button with LED.
For the details of HDD Status/Fault LED, HDD Active LED, refer to “QuantaGrid Series D51B-2U Technical Guide”.

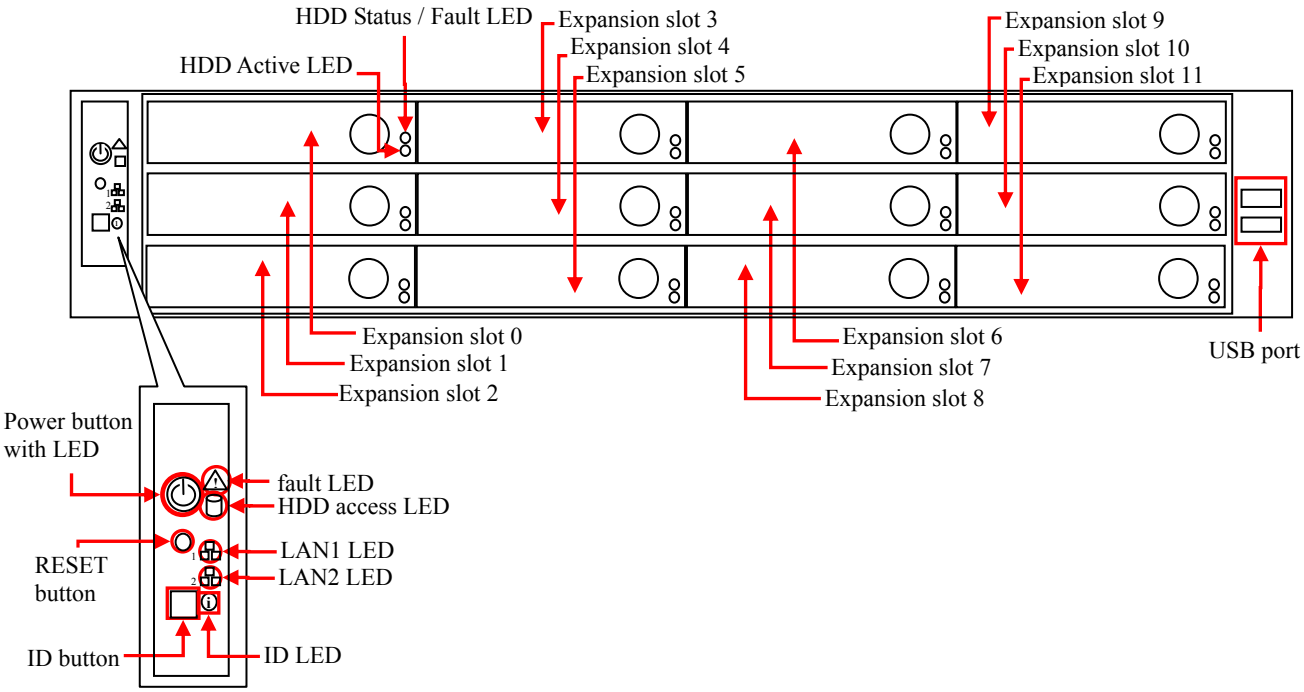

Figure A.2.1.1-1 Location of Power button with LED, RESET button

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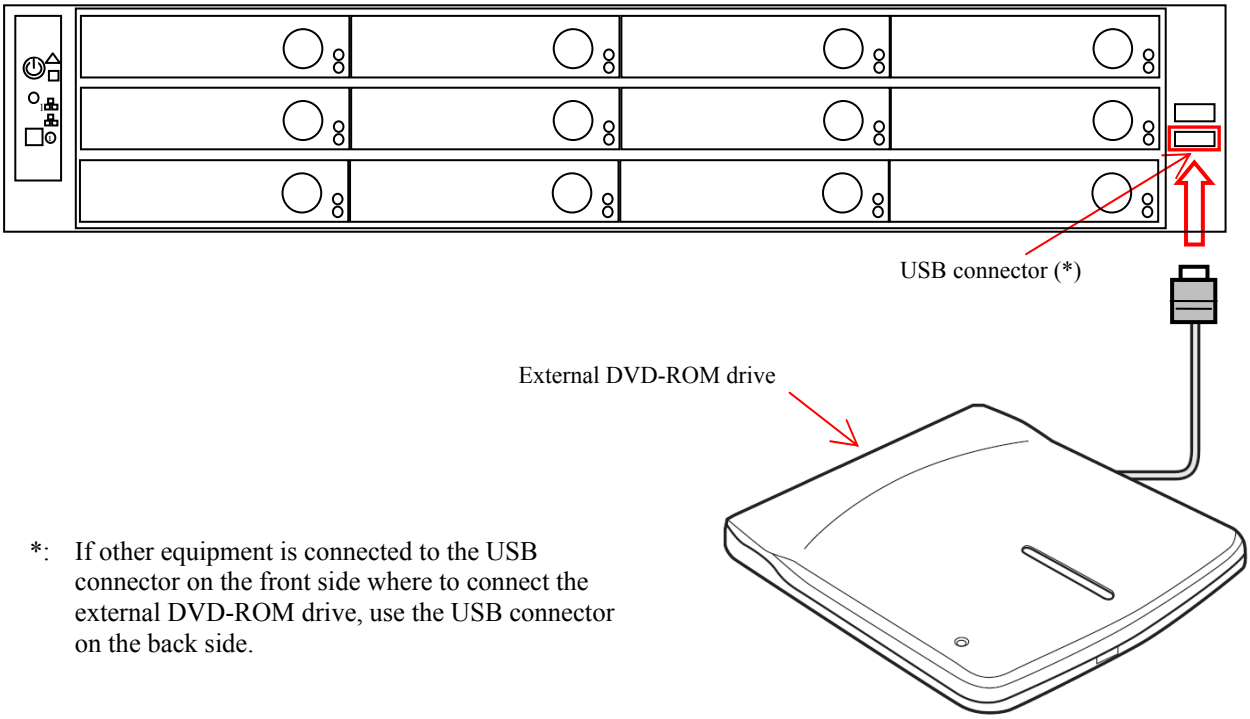
A.2.1.2 External DVD-ROM drive

D51B-2U uses external DVD-ROM drive because it does not incorporate internal DVD-ROM drive. Figure A.2.1.2-1 shows the connecting part for external DVD-ROM drive.



*: If other equipment is connected to the USB connector on the front side where to connect the external DVD-ROM drive, use the USB connector on the back side.

Figure A.2.1.2-1 Connecting External DVD-ROM Drive

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A.2.2 Back side

D51B2U also incorporates expansion slots on the back side.

Figure A.2.2-1 shows the location of expansion slots on the back side. For the details of HDD Active LED, HDD Fault LED, refer to “QuantaGrid Series D51B-2U Technical Guide”.

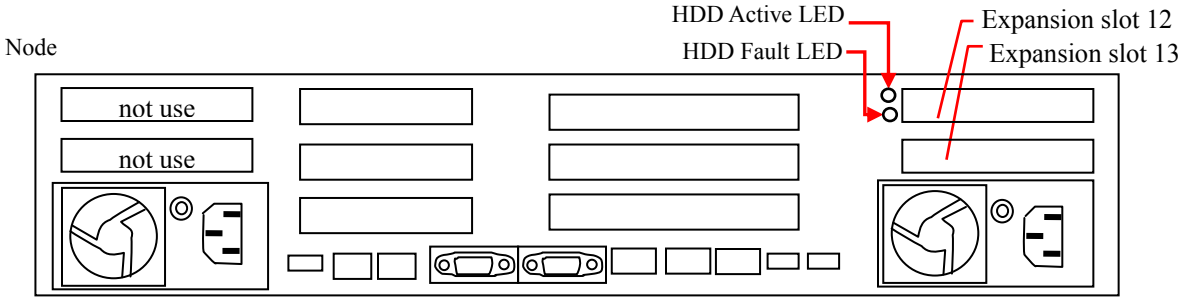

Figure A.2.2-1 Location of Expansion slots on back side

A.2.2.1 Power source unit

Figure A.2.2.1-1 shows the mounted location of the power source unit. For the details of Power source LED, refer to “QuantaGrid Series D51B-2U Technical Guide”.

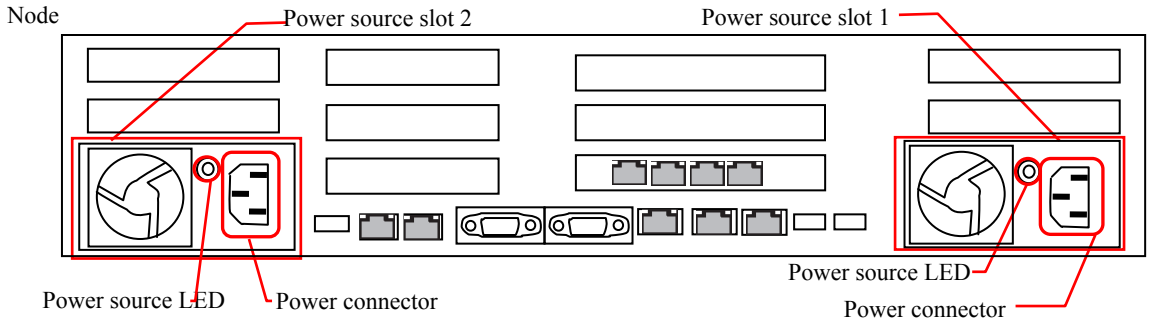

Figure A.2.2.1-1 Location of the mounted power source unit

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A.2.2.2 Port arrangement and port names

(1) Node of D51B-2U in the cluster configuration

Figure A.2.2.2-1 shows the port names on the backside of a node.
When the maintenance tool is used, the port name of the diagram is shown.
'Table A.2.2.2-1 Confirmation Table for the Port Allocation of Node' shows the correspondence between the port names displayed on the maintenance CLI (names on the OS) and the actual port positions of a node.
From (a) to (g) shows the rear view of the node in each option card mounting pattern (7 patterns). "Riser1: Slot1" and "Riser2: Slot1" are fixed.

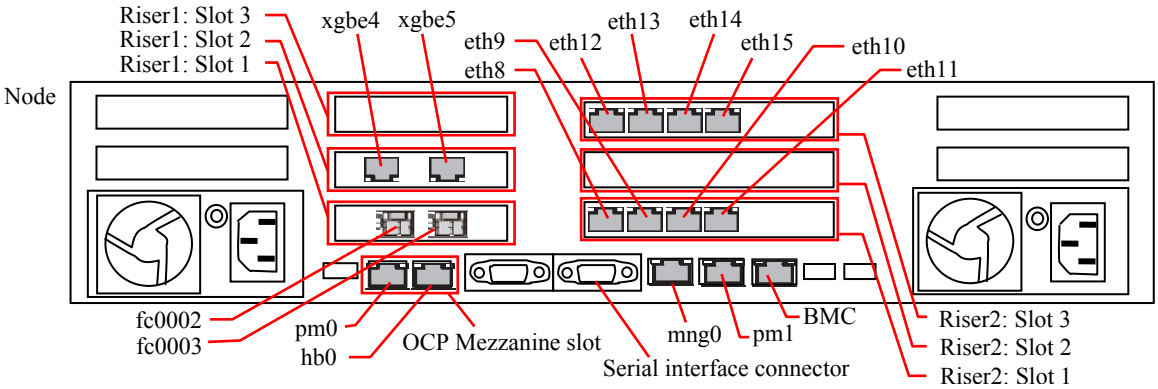

Figure A.2.2.2-1 Rear View of the Node (Cluster Configuration) (Example)

Table A.2.2.2-1 Confirmation Table for the Port Allocation of Node

#	Position	Interface name			Application	Remarks
		GbE	10GbE	FC		
1	OCP Mezzanine	pm0			Private Maintenance port	—
2		hb0			heartbeat port	—
3	BMC	— (none)			BMC	—
4	On-board		mng0 (Copper)		Management port	PCI-Express gen3 <× 8>
5			pm1 (Copper)		BMC communication port	
6	Riser2: Slot:1	eth8			Data port	PCI-Express gen3 <× 8>
7		eth9			Data port	
8		eth10			Data port	
9		eth11			Data port	
10	Riser2: Slot:2				—	—
11	Riser2: Slot:3	eth12	xgbe8 (*1)		Data port	PCI-Express gen3 <× 16>
12		eth13	xgbe9 (*1)		Data port	
13		eth14			Data port	
14		eth15			Data port	
15	Riser1: Slot:1			fc0002	Connecting a FC port and the disk array subsystem	PCI-Express gen3 <× 8>
16				fc0003	Connecting a FC port and the disk array subsystem	
17	Riser1: Slot:2		xgbe4 (*1)		Data port	PCI-Express gen3 <× 8>
18			xgbe5 (*1)		Data port	
19	Riser1: Slot:3				(RAID card Mezzanine)	—

*1: 10GbE for Riser2: Slot:3 and Riser1: Slot:2 can mount the both Copper and Optical cable types.
However the configuration in which the different types of cable are mounted together is not available.

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The following shows the 7 built-in patterns by the combination of the option card.

NOTE: Port of 10GbE card is an example of copper interface. In the case of optical interface, the shapes of the port are different.

(a) Mounting 2 port 10GbE card in the extension “Riser1: Slot2”

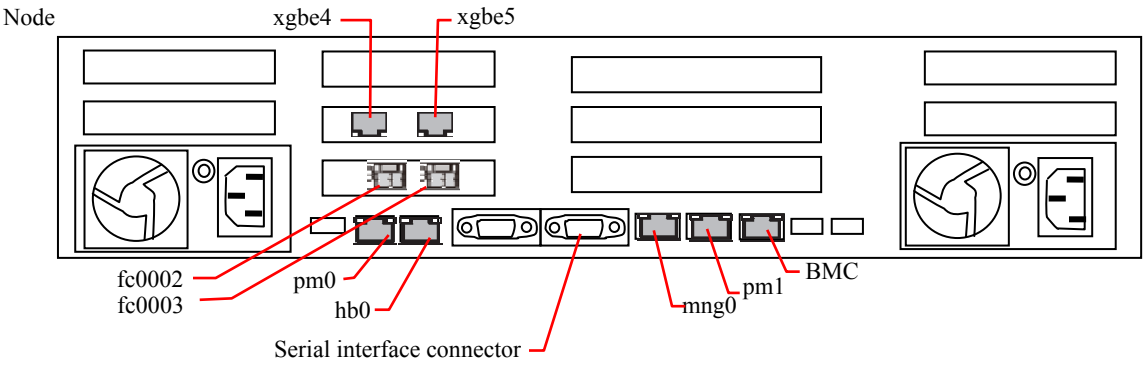

Figure A.2.2.2-2 Rear View of the Node (Cluster Configuration) (1)

(b) Mounting 4 port 1GbE card in the extension “Riser2: Slot1”

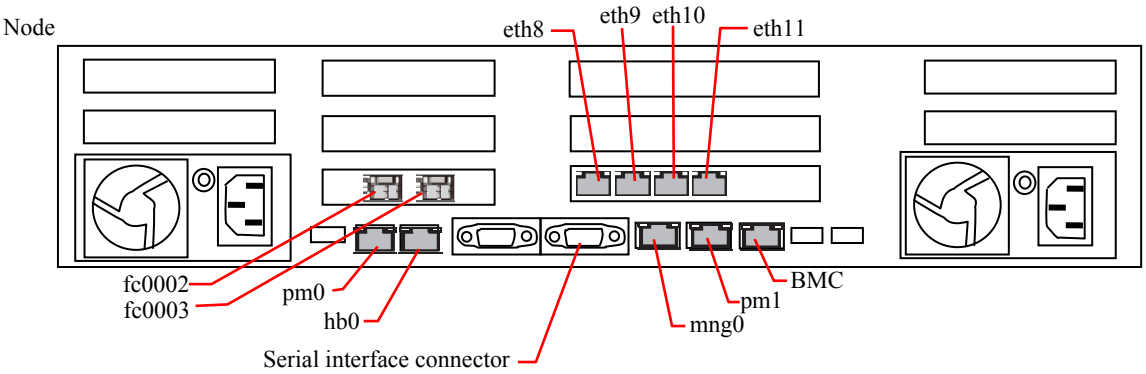

Figure A.2.2.2-3 Rear View of the Node (Cluster Configuration) (2)

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(c) Mounting 2 port 10GbE card in the extension “Riser1: Slot2” and 4 port 1GbE card in the extension “Riser2: Slot1”

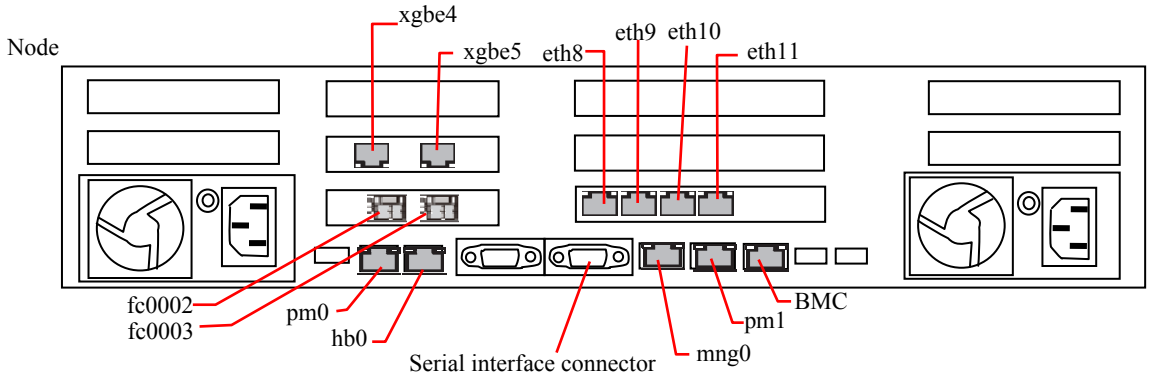

Figure A.2.2.2-4 Rear View of the Node (Cluster Configuration) (3)

(d) Mounting 2 port 10GbE card in the “Riser1: Slot2” and 2 port 10 GbE card in the “Riser2: Slot3”

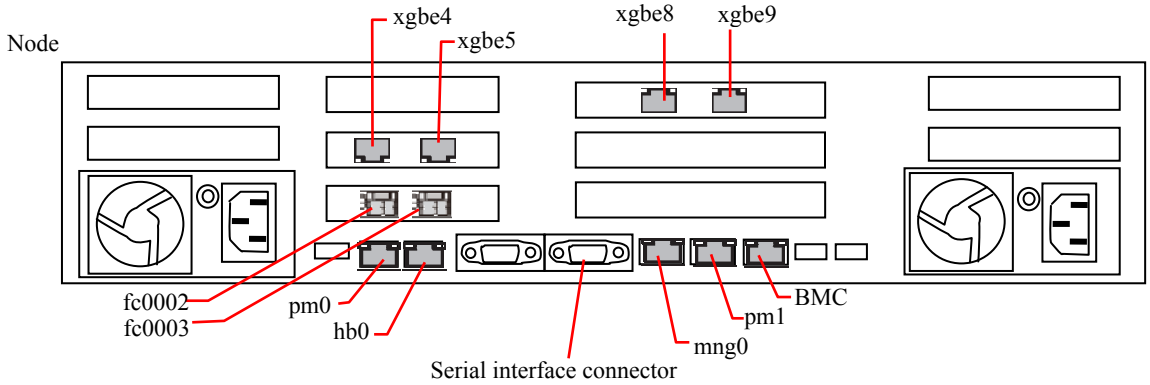

Figure A.2.2.2-5 Rear View of the Node (Cluster Configuration) (4)

(e) Mounting 4 port 1GbE card in the extension “Riser2: Slot1” and 4 port 1 GbE card in the “Riser2: Slot3”

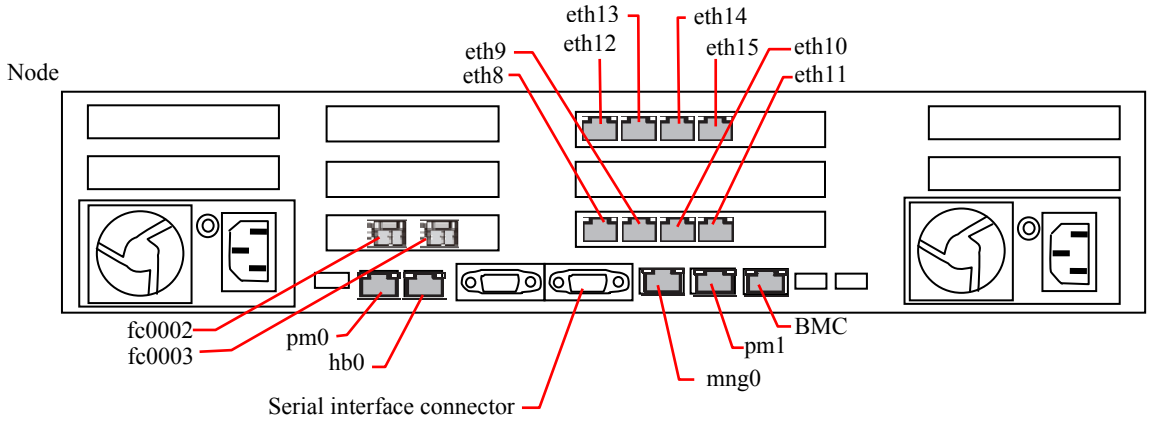

Figure A.2.2.2-6 Rear View of the Node (Cluster Configuration) (5)

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(f) Mounting 2 port 10GbE card in the “Riser1: Slot2” and 4 port 1GbE card in the extension “Riser2: Slot1” and 4 port 1 GbE card in the “Riser2: Slot3”

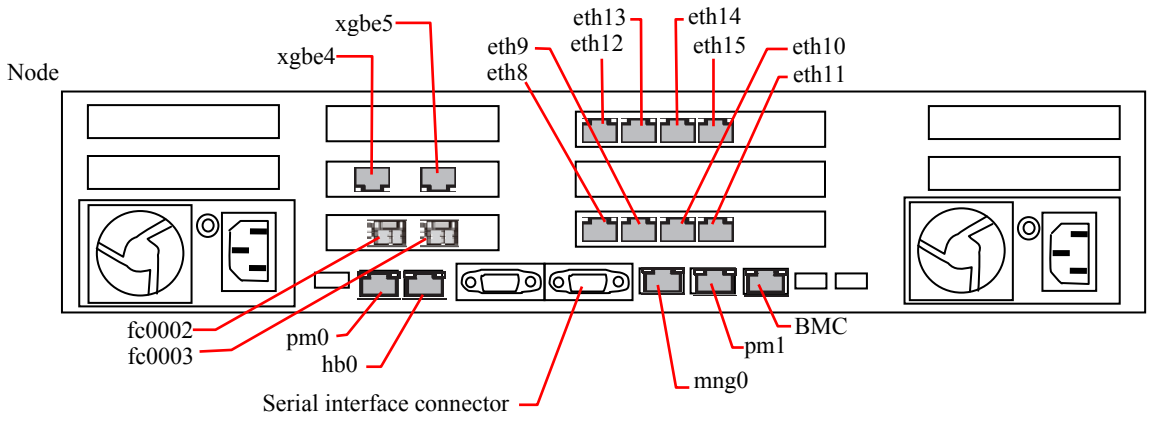

Figure A.2.2.2-7 Rear View of the Node (Cluster Configuration) (6)

(g) Mounting 2 port 10GbE card in the “Riser1: Slot2” and 4 port 1GbE card in the extension “Riser2: Slot1” and 2 port 10 GbE card in the “Riser2: Slot3”

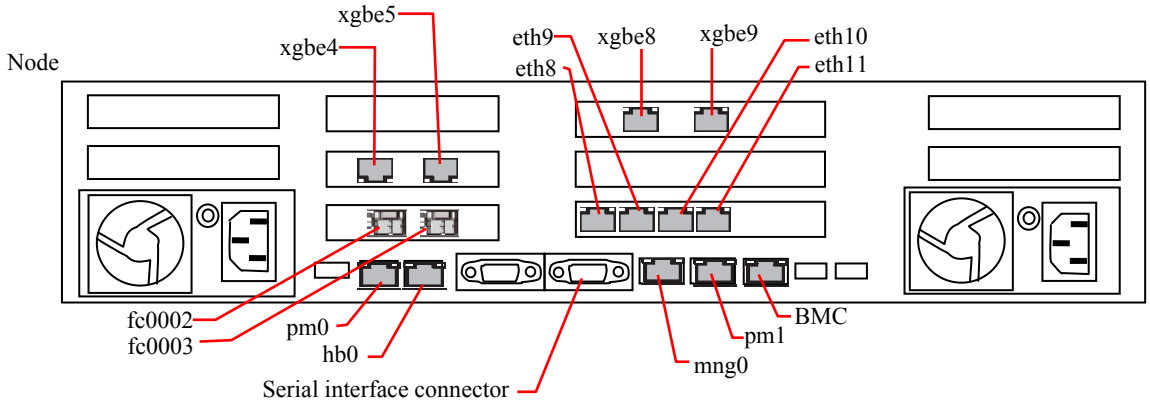

Figure A.2.2.2-8 Rear View of the Node (Cluster Configuration) (7)

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(2) Node of D51B-2U in the single node configuration

Figure A.2.2.2-7 shows the port names on the backside of a node.
When the maintenance tool is used, the port name of the diagram is shown.
'Table A.2.2.2-2 Confirmation Table for the Port Allocation of Node' shows the correspondence between the port names displayed on the maintenance CLI (names on the OS) and the actual port positions of a node.
From (a) to (~~j~~h) shows the rear view of the node in each option card mounting pattern (8 patterns). There is no fixed slot.

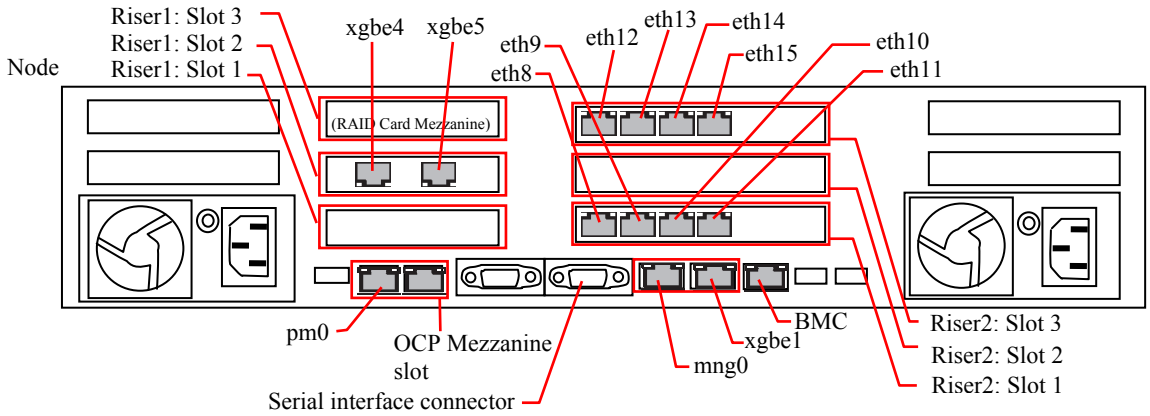

Figure A.2.2.2-9 Rear View of the Node (Single Node Configuration) (Example)

Table A.2.2.2-2 Confirmation Table for the Port Allocation of Node

#	Position	Interface name			Application	Remarks
		GbE	10GbE	FC		
1	OCP Mezzanine	pm0			Private Maintenance port	—
2	BMC	— (none)			BMC	—
3	On-board		mng0 (Copper)		Management port	PCI-Express gen3 <×8>
4			xgbe1 (Copper)		Data port	
5	Riser2: Slot:1	eth8			Data port	PCI-Express gen3 <×16>
6		eth9			Data port	
7		eth10			Data port	
8		eth11			Data port	
9	Riser2: Slot:2				—(Not use)	—
10	Riser2: Slot:3	eth12	xgbe8 (*1)		Data port	PCI-Express gen3 <×8>
11		eth13	xgbe9 (*1)		Data port	
12		eth14			Data port	
13		eth15			Data port	
14	Riser1: Slot:1				—(reserved)	—
15	Riser1: Slot:2		xgbe4 (*1)		Data port	PCI-Express gen3 <×8>
16			xgbe5 (*1)		Data port	
17	Riser1: Slot:3				(RAID card Mezzanine)	—

*1: 10GbE for Riser2: Slot:3 and Riser1: Slot:2 can mount the both Copper and Optical cable types.
However the configuration in which the different types of cable are mounted together is not available.

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The following shows the 8 built-in patterns by the combination of the option card.

NOTE: Port of 10GbE card is an example of copper interface. In the case of optical interface, the shapes of the port are different.

(a) No option card

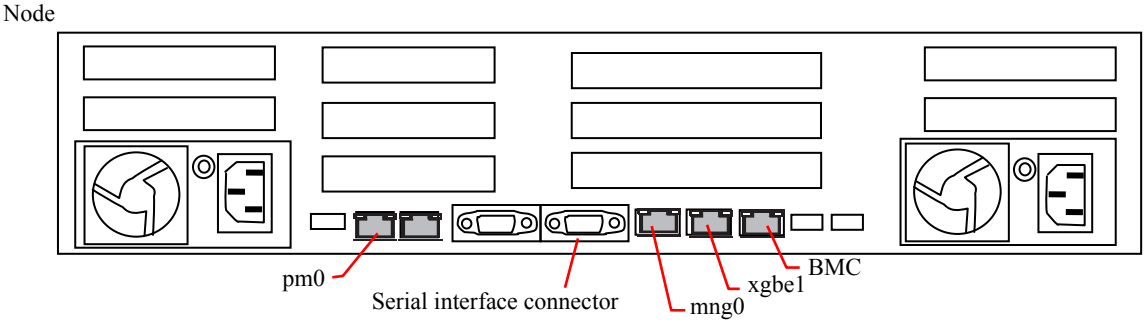

Figure A.2.2.2-10 Rear View of the Node (Single Node Configuration) (1)

(b) Mounting 2 port 10GbE card in the "Riser1: Slot2"

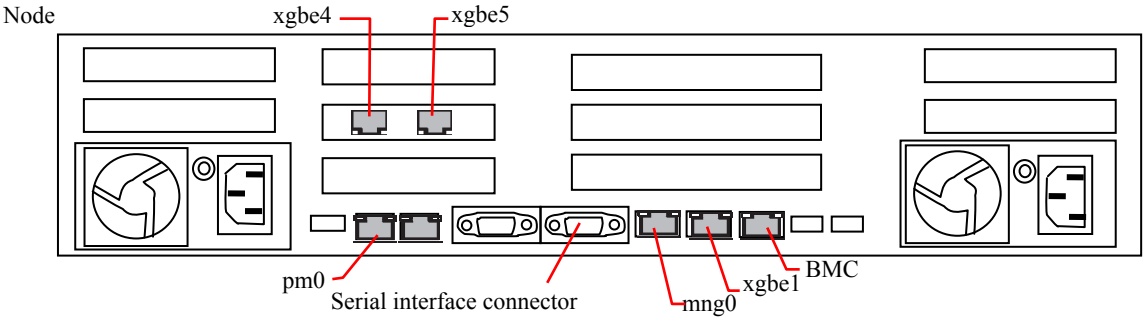

Figure A.2.2.2-11 Rear View of the Node (Single Node Configuration) (2)

(c) Mounting 4 port 1GbE card in the "Riser2: Slot1"

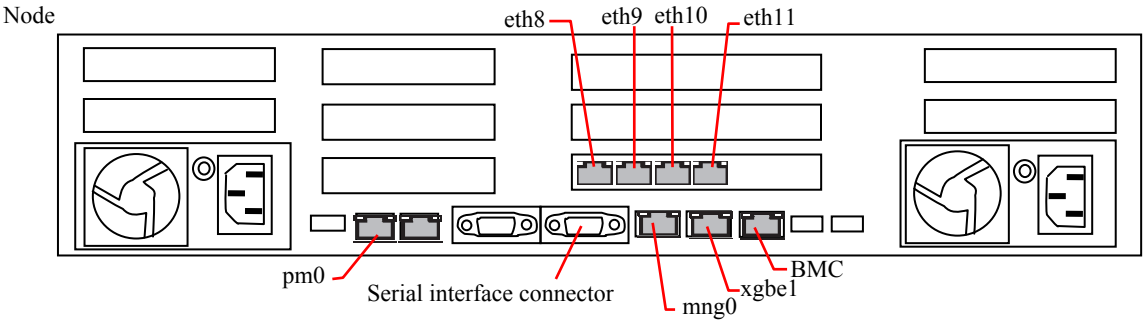

Figure A.2.2.2-12 Rear View of the Node (Single Node Configuration) (3)

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(d) Mounting 2 port 10GbE card in the “Riser1: Slot2” and 4 port 1GbE card in the “Riser2: Slot1”

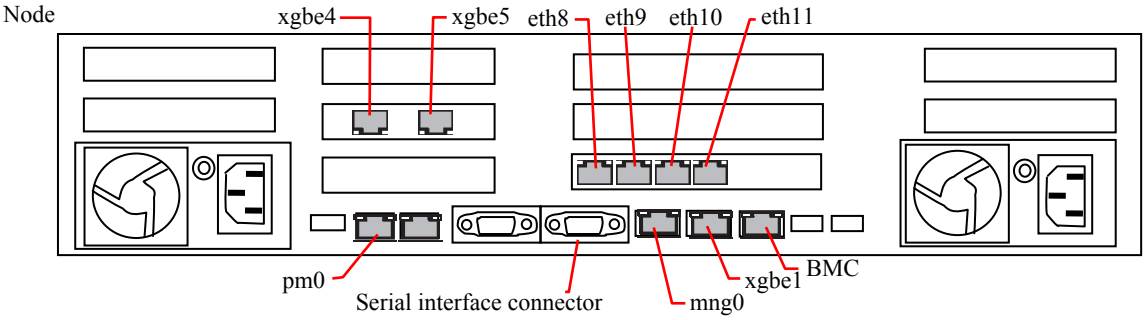

Figure A.2.2.2-13 Rear View of the Node (Single Node Configuration) (4)

(e) Mounting 2 port 10GbE card in the “Riser1: Slot2” and 2 port 10 GbE card in the “Riser2: Slot3”

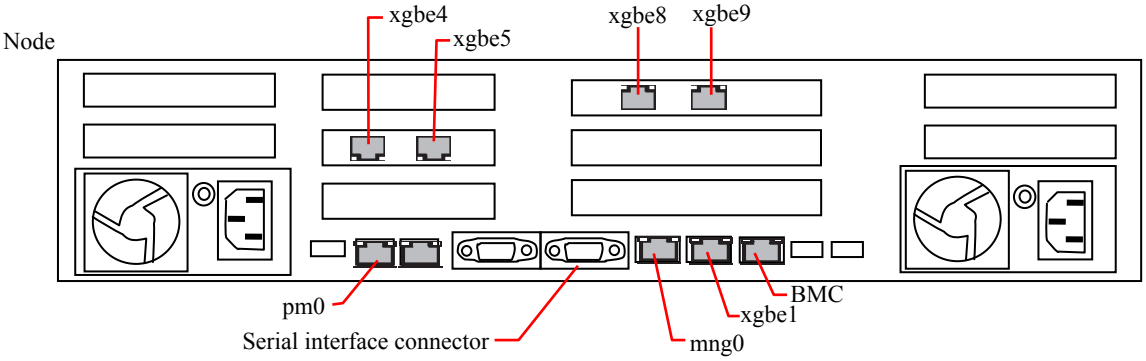

Figure A.2.2.2-14 Rear View of the Node (Single Node Configuration) (5)

(f) Mounting 4 port 1GbE card in the “Riser2: Slot1” and 4 port 1GbE card in the “Riser2: Slot3”

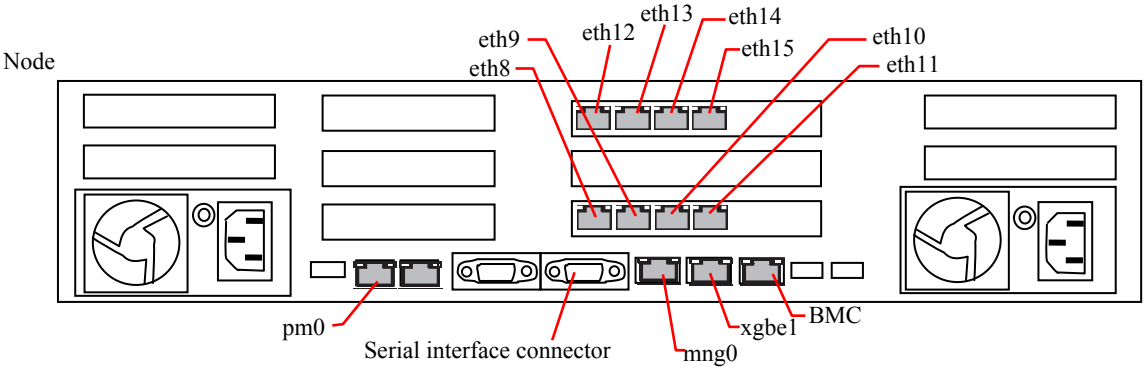

Figure A.2.2.2-15 Rear View of the Node (Single Node Configuration) (6)

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(g) Mounting 2 port 10GbE card in the “Riser1: Slot2” and 4 port 1GbE card in the “Riser2: Slot1” and 4 port 1GbE card in the “Riser2: Slot3”

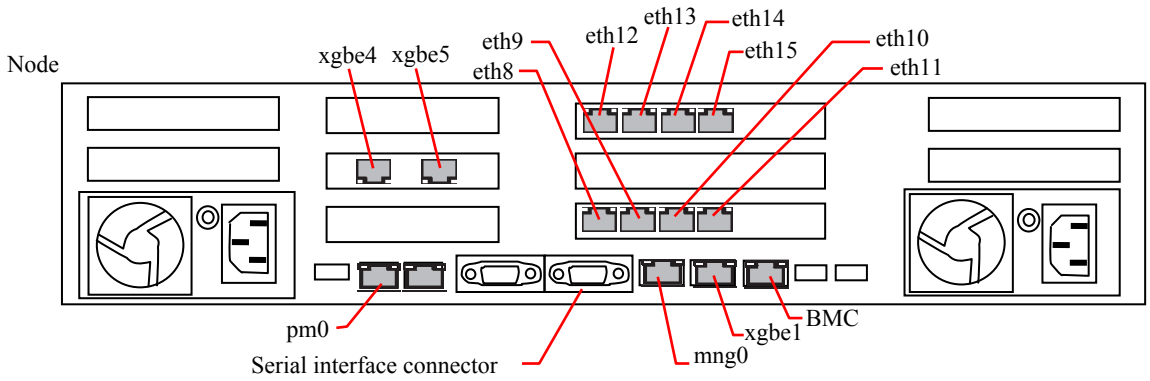

Figure A.2.2.2-16 Rear View of the Node (Single Node Configuration) (7)

(h) Mounting 2 port 10GbE card in the “Riser1: Slot2” and 2 port 10GbE card in the “Riser2: Slot1” 4 port 1 GbE card in the “Riser2: Slot3”

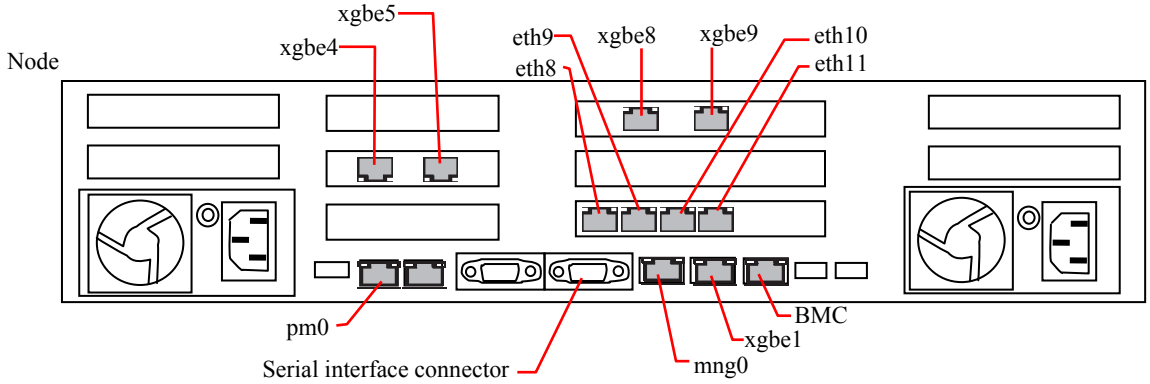

Figure A.2.2.2-17 Rear View of the Node (Single Node Configuration) (8)

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A.2.3 LAN Cable

NOTE: When using the customer's management LAN IP-SW, request the customer to connect the connections of #1 to #4 of Management VLAN ports shown in the Figure A.2.3.1-1 to the 4 of 6 ports provided by the customer.

A.2.3.1 In the Case of Cluster Configuration shows the LAN cable connection when it is cluster configuration.

A.2.3.1 In the case of cluster configuration

Note that No. 9 port of the management LAN IP-SW is unoccupied port because it is an alternative port for No.1 or No.3 port of the Management LAN IP-SW in case when problem occurs.
However, if the No.9 port is occupied with the use of HiTrack, No.8 port is used as an alternative port.

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(1) Connecting the management system network

Connect the management port (mng) of node0 to port 1 on the management LAN IP-SW, and connect the BMC of node0 to port 2 on the management LAN IP-SW.
Connect the management port (mng) of node1 to port 3 on the management LAN IP-SW, and connect the BMC of node1 to port 4 on the management LAN IP-SW.
Connect the management server to port 7 on the management LAN IP-SW.

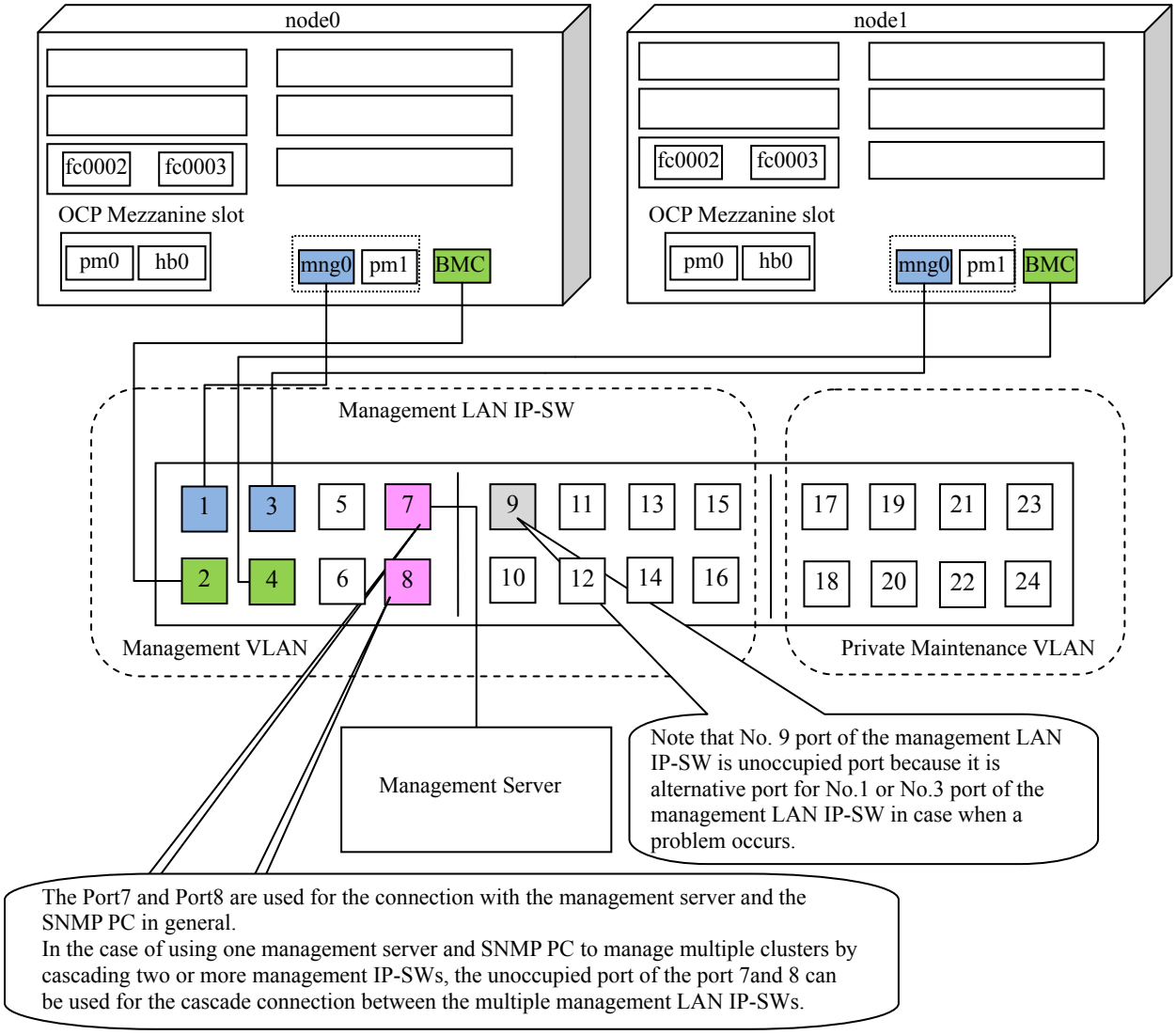

Figure A.2.3.1-1 Connection Diagram for the Management System Network

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Figure A.2.3.1-1-1 shows an example of connection diagram in the case the OS version is 3.2.2-XX or later and in the BMC direct connection configuration.
Ports on the management LAN IP-SW which will be connected to the management port (mng0) on each node can be chosen arbitrarily.

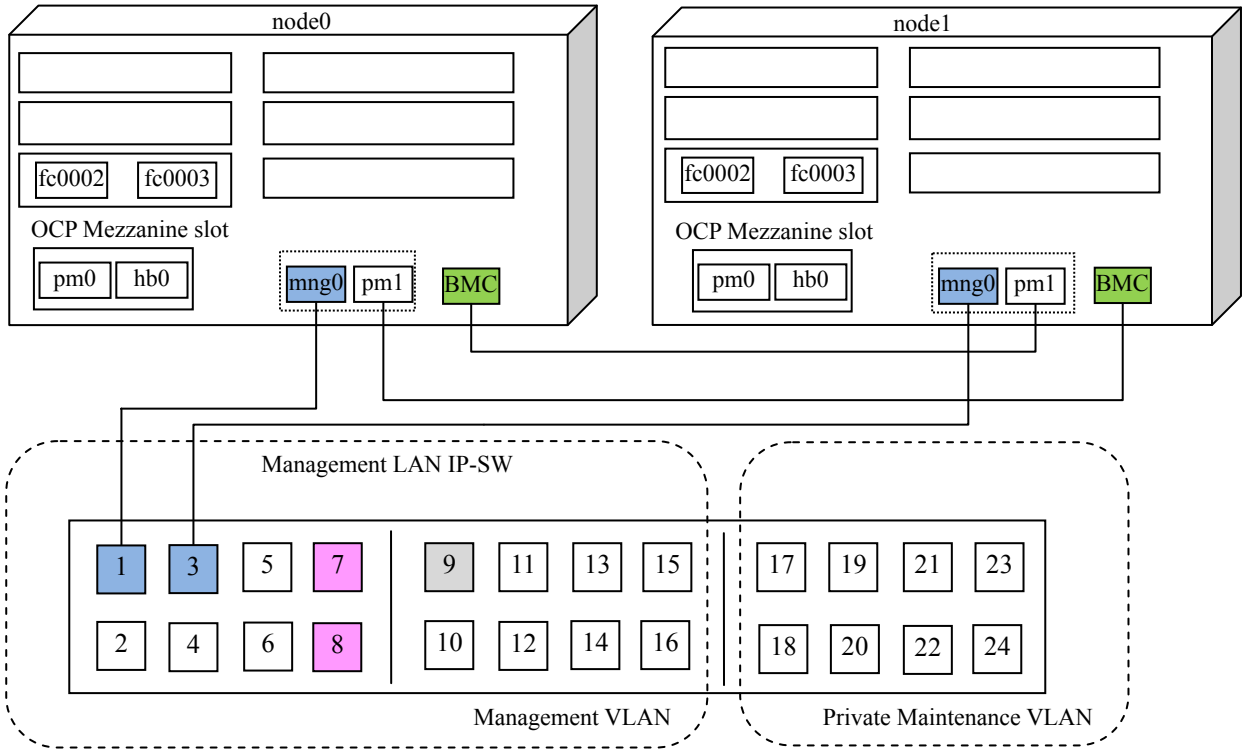

Figure A.2.3.1-1-1 Connection Diagram for the Management System Network (BMC Direct Connection Configuration)

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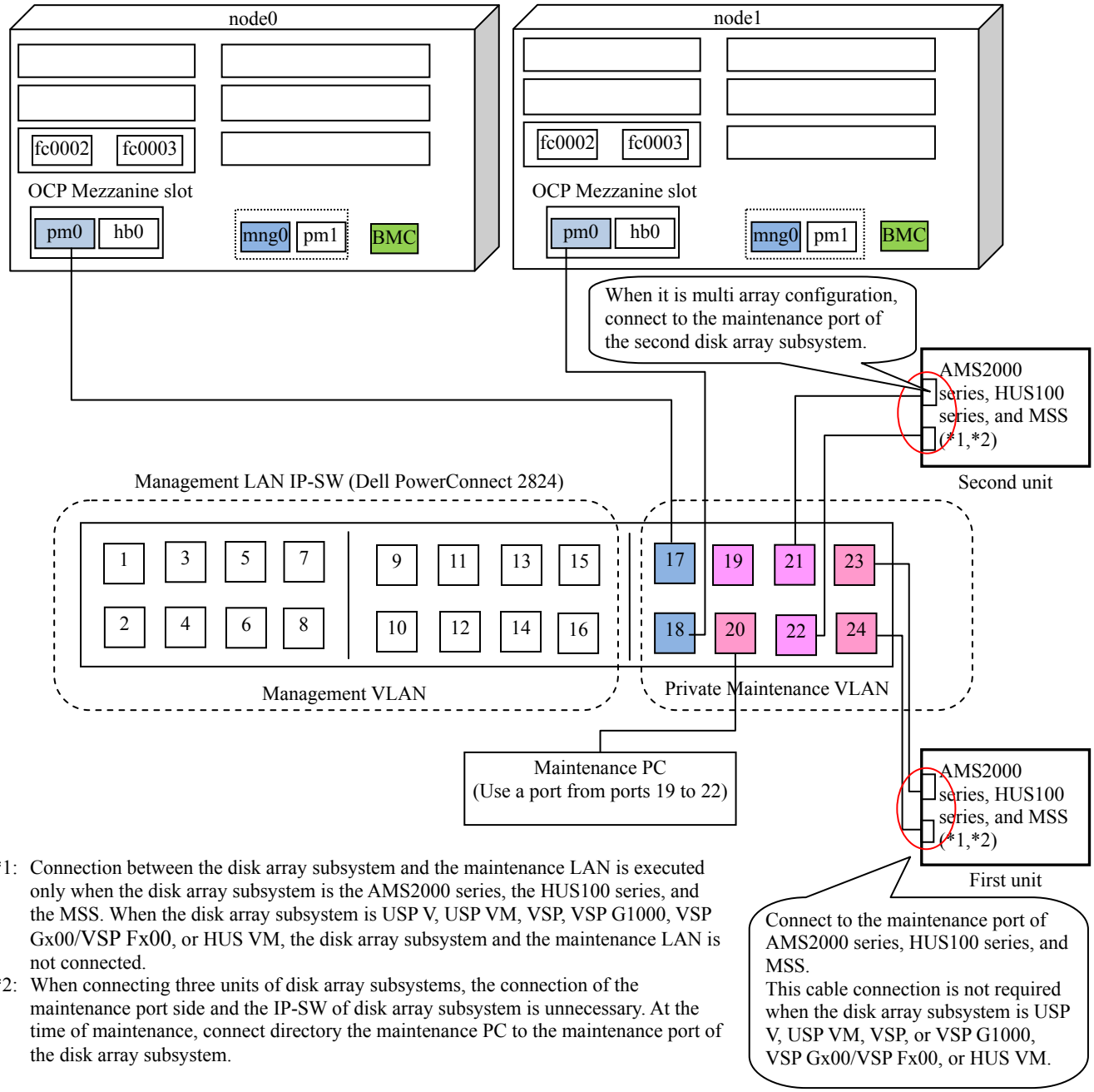
(2) Connecting the private maintenance ports

NOTE: This connection is unnecessary when the customer's management LAN IP-SW is used.

Connect the private maintenance port (pm) of node0 to port 17 on the management LAN IP-SW.
Connect the private maintenance port (pm) of node1 to port 18 on the management LAN IP-SW.
When you use a maintenance PC, connect it to a free port from ports 19 to 22 on management LAN IP-SW.



*1: Connection between the disk array subsystem and the maintenance LAN is executed only when the disk array subsystem is the AMS2000 series, the HUS100 series, and the MSS. When the disk array subsystem is USP V, USP VM, VSP, VSP G1000, VSP Gx00/VSP Fx00, or HUS VM, the disk array subsystem and the maintenance LAN is not connected.

*2: When connecting three units of disk array subsystems, the connection of the maintenance port side and the IP-SW of disk array subsystem is unnecessary. At the time of maintenance, connect directory the maintenance PC to the maintenance port of the disk array subsystem.

Figure A.2.3.1-2 Private Maintenance Port Connection Diagram

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(3) Connecting the heartbeat ports

Connect the heartbeat ports (hb) of nodes 0 and 1.
For the LAN cable to connect the heartbeat port, the 5E or more categories is required.

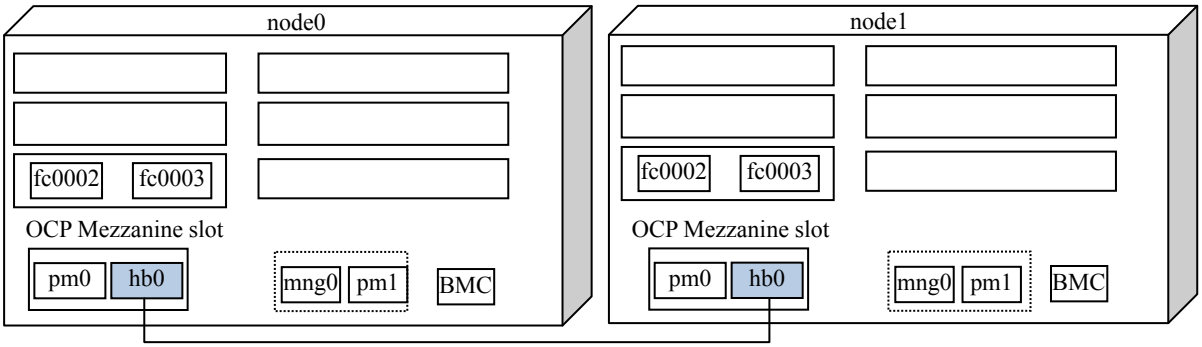

Figure A.2.3.1-3 Heartbeat Port Connection Diagram

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(4) Connecting the management LAN IP-SW and the disk array subsystem

Disk array subsystems are connected to the management LAN only for the AMS2000 series or HUS100 series. They are not necessary to be connected to the management LAN for USP V, USP VM, VSP, VSP G1000, VSP Gx00/VSP Fx00, or HUS VM. If disk array subsystems are connected, connect them to #5 or #6.

Connect ports 5 and 6 on the management LAN IP-SW to the user management port (LAN1) on the disk array subsystem (first unit).
When connecting one more disk array subsystem, connect the disk array subsystem to the port 11 and 12 on the management LAN IP-SW. When connecting third unit of disk array subsystem, apply cascade connection by connecting the disk array subsystem to the port 13 and 14 or add an IP-SW or connect the disk array subsystem to the port 15 and 16 if the port 15 and 16 on the management VLAN are unoccupied.

NOTE: When using the customer's management LAN IP-SW, request the customer to connect the connections of #5 to #6 of Management VLAN ports shown in the Figure A.2.3.1-4 to the 2 of 6 ports provided by the customer.

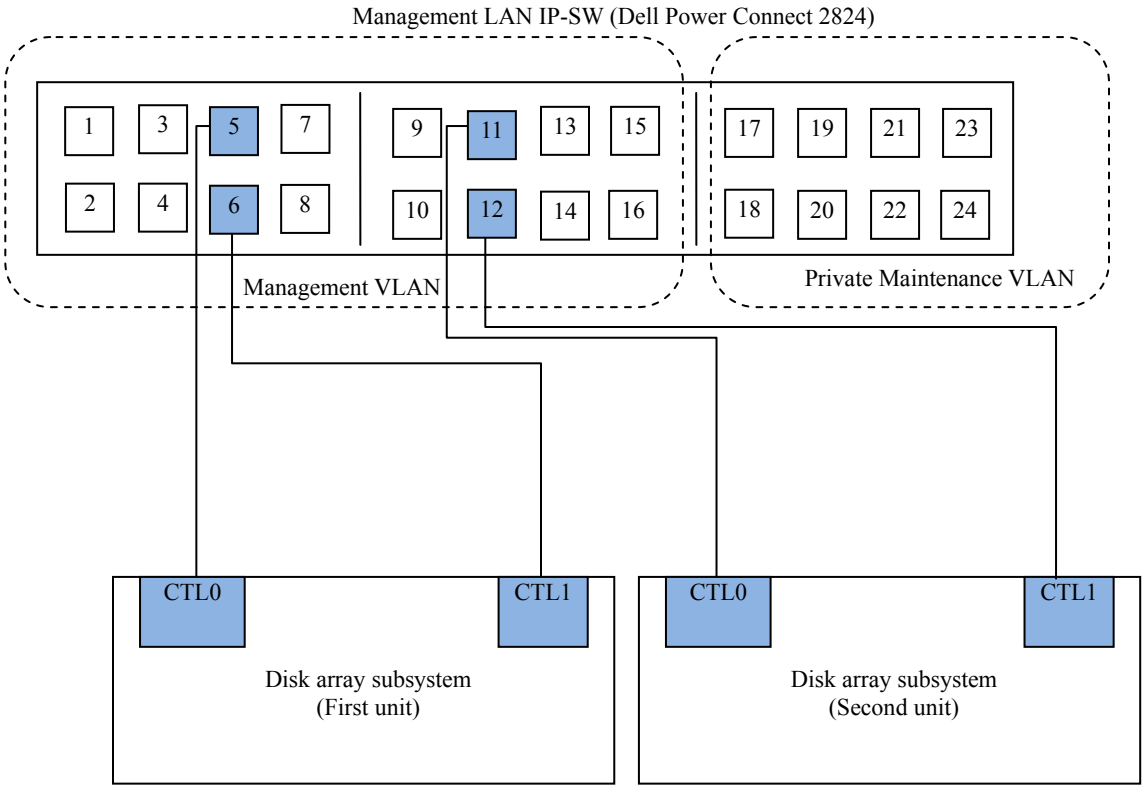

Figure A.2.3.1-4 Connection Diagram for the Management LAN IP-SW and the Disk Array Subsystem

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(5) Connecting the front-end LAN

NOTE: When using the HiTrack in the configuration of HDI for HCP, the customer's Management LAN IP-SW and front-end LAN are needed to be connected.

Connect port 10 on the management LAN IP-SW to the router.
Connect the router to the front-end LAN.
Router is connected only when the system environment is the configuration of HDI for HCP, and a customer makes a contract of Hi-Track with HDS.

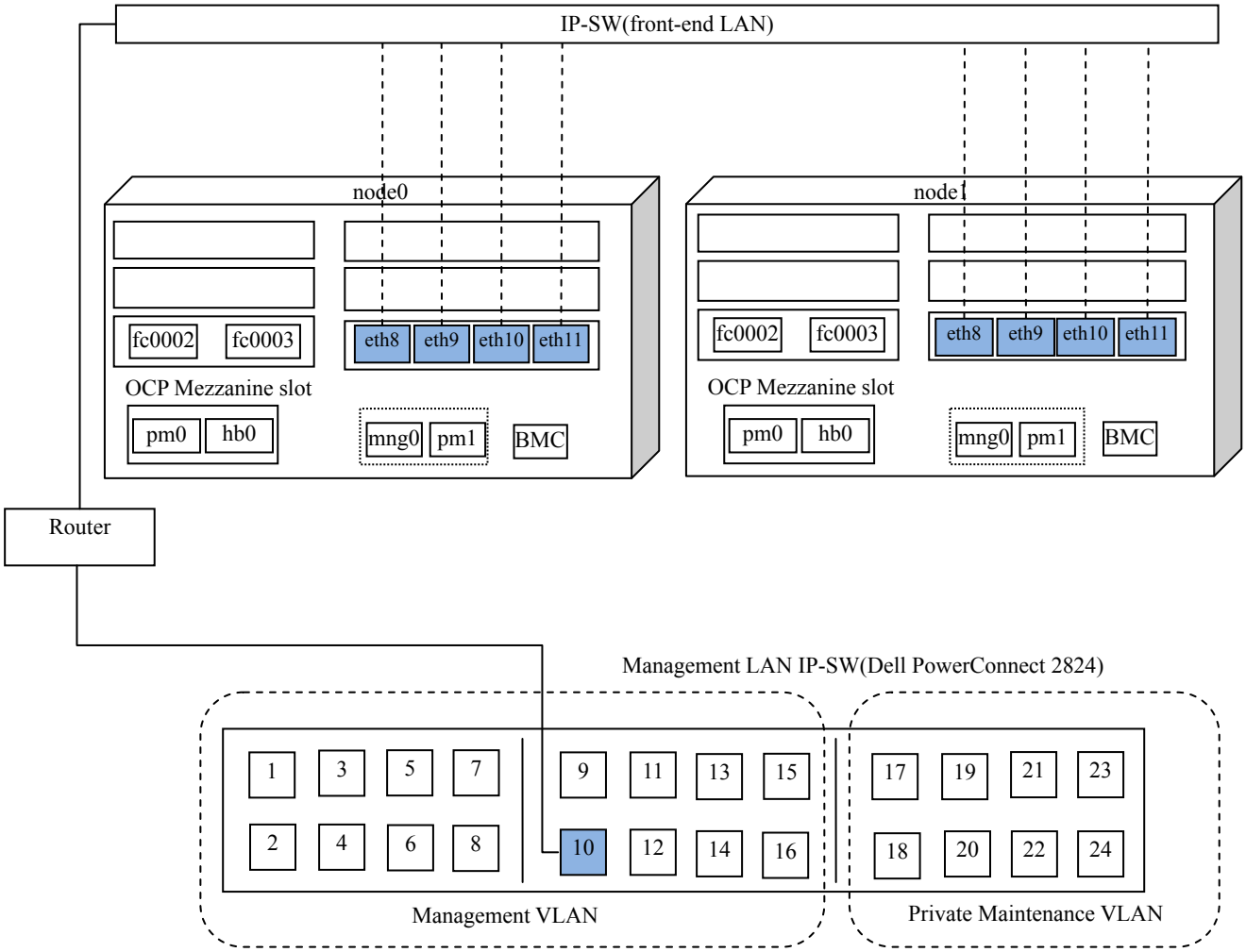

Figure A.2.3.1-5 Front-end LAN Connection Diagram

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(6) Connecting the HiTrack PC

NOTE: When using the customer's management LAN IP-SW, request the customer to connect the HiTrack PC to the customer's management LAN IP-SW.

Figure A.2.3.1-6 shows the HiTrack PC connection diagram. (Either HiTrack or SNMP is required.)

Connect the HiTrack PC to port 9 on the management LAN IP-SW.
When you use SNMP, connect it to port 8 on the management LAN IP-SW.

HiTrack monitors HDI via the management LAN.
It also monitors the HCP node via the connection with the front-end LAN described in (5).

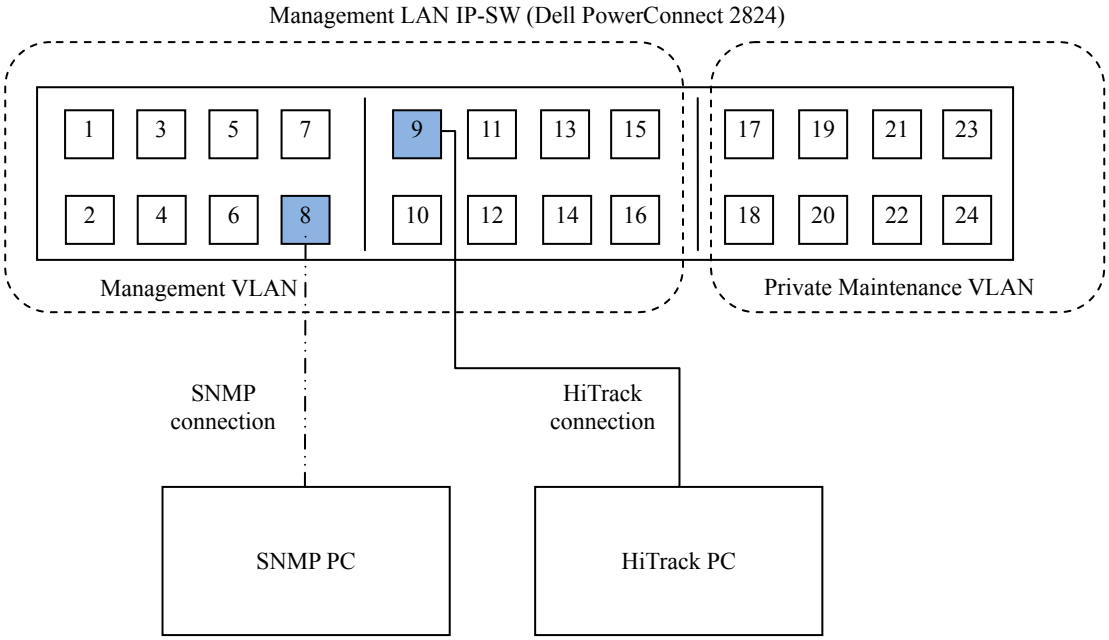

Figure A.2.3.1-6 HiTrack PC Connection Diagram

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A.2.3.2 In the case of single node configuration

(1) Connecting the front-end LAN
Figure A.2.3.2-1 shows a case of front-end LAN connection by using 4 LAN cables, and Figure A.2.3.2-2 shows a case of front-end LAN by using one LAN cable.

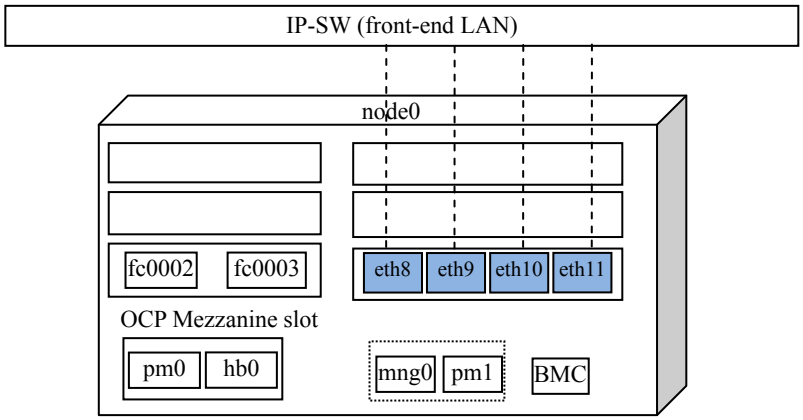

Figure A.2.3.2-1 Front-end LAN Connection by using 4 LAN cables (Configuration using trunk 4 Data ports)

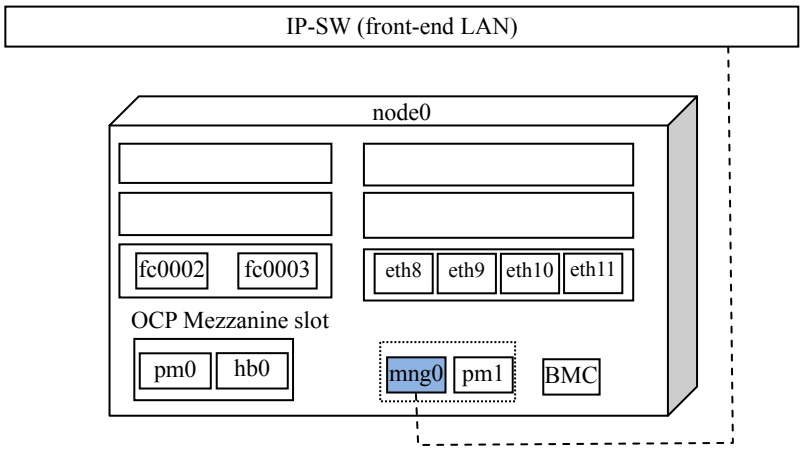

Figure A.2.3.2-2 Front-end LAN Connection by using one LAN cable (Configuration using Management port)

(2) Connecting the private maintenance ports

Private Maintenance port should be connected directly with a maintenance PC.

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A.2.4 Notes on Port when Maintenance Mode is Used

This is unsupported mode in this model.

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A.4.4 Example of Installing the Node in the Configuration of HDI for HCP (single node)

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A.4.6 Example of Installing the Node in the Configuration of HDI for Cloud (single node)

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A.4 Installing the Nodes

A.4.1 Example of Installing the Node in the Basic Configuration (cluster node)

HDI does not support Basic Configuration.

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A.4.2 Example of Installing the Node in the Basic Configuration (single node)

HDI does not support Basic Configuration.

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A.4.3 Example of Installing the Node in the Configuration of HDI for HCP (cluster node)

CAUTION

To prevent a rack frame fall, install the heavier devices on the lower positions as much as possible. The devices must be installed in the order of a position from the bottom. Please make sure when you install nodes on your rack frame.

The following figure shows an example of installing the nodes of Hitachi Data Ingestor on a rack on which the Hitachi Content Platform has been installed.
Installing Hitachi Data Ingestor including Management LAN IP-SW requires a 5U rack space. Figure A.4.3-1 shows an example of installing the basic chassis of HUS series and three extension chassis mounted from the bottom of the rack frame. In this case, totally 8U rack spaces are required with the basic chassis and three extension chassis.
When connecting with USP V, USP VM, or VSP the disk array subsystem will not be installed on a rack frame of which the node is installed.

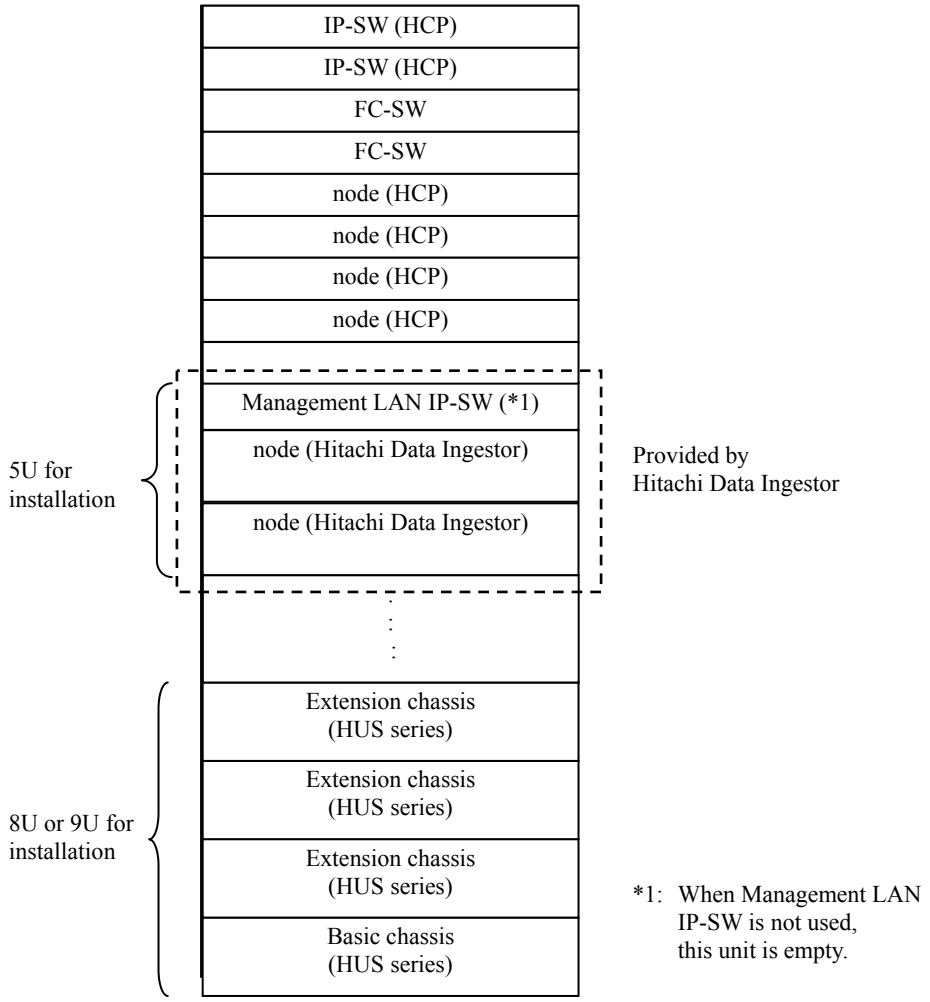

Figure A.4.3-1 Example of Installing the node in the Configuration of HDI for HCP

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A.4.4 Example of Installing the Node in the Configuration of HDI for HCP (single node)

CAUTION

To prevent a rack frame fall, install the heavier devices on the lower positions as much as possible. The devices must be installed in the order of a position from the bottom. Please make sure when you install nodes on your rack frame.

The following figure shows an example of installing the nodes of Hitachi Data Ingestor on a rack on which the Hitachi Content Platform has been installed.
There are no Management LAN IP-SW, Array Storage, and KVM in HDI single node configuration, so HDI needs only 2U for one D51B-2U.
Figure A.4.4-1 shows an example of installing the basic chassis and 3 extended chassis of HUS in the order of a position from the bottom.

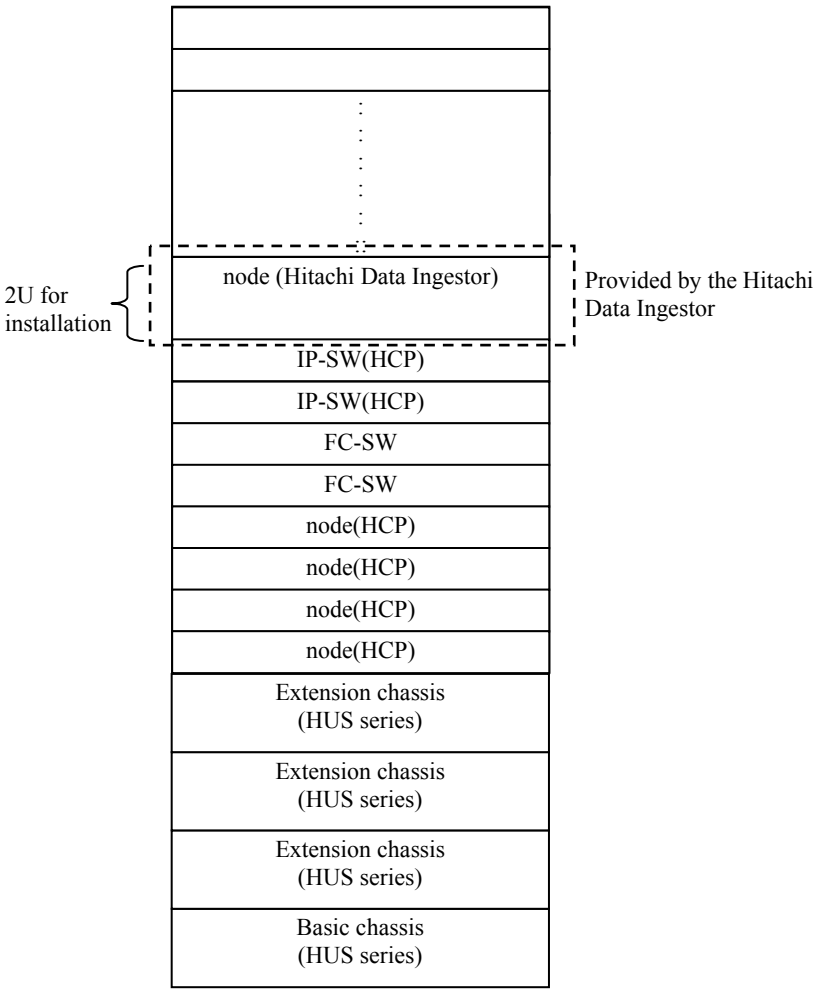

Figure A.4.4-1 Example of Installing the node in the Configuration of HDI for HCP (single node)

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A.4.5 Example of Installing the Node in the Configuration of HDI for Cloud (cluster node)

CAUTION

To prevent a rack frame fall, install the heavier devices on the lower positions as much as possible. The devices must be installed in the order of a position from the bottom. Please make sure when you install nodes on your rack frame.

The disk array subsystem in the figure shows an example with HUS series.

Figure A.4.5-1 shows an example of installing the nodes of HDI for Cloud configuration (cluster node).

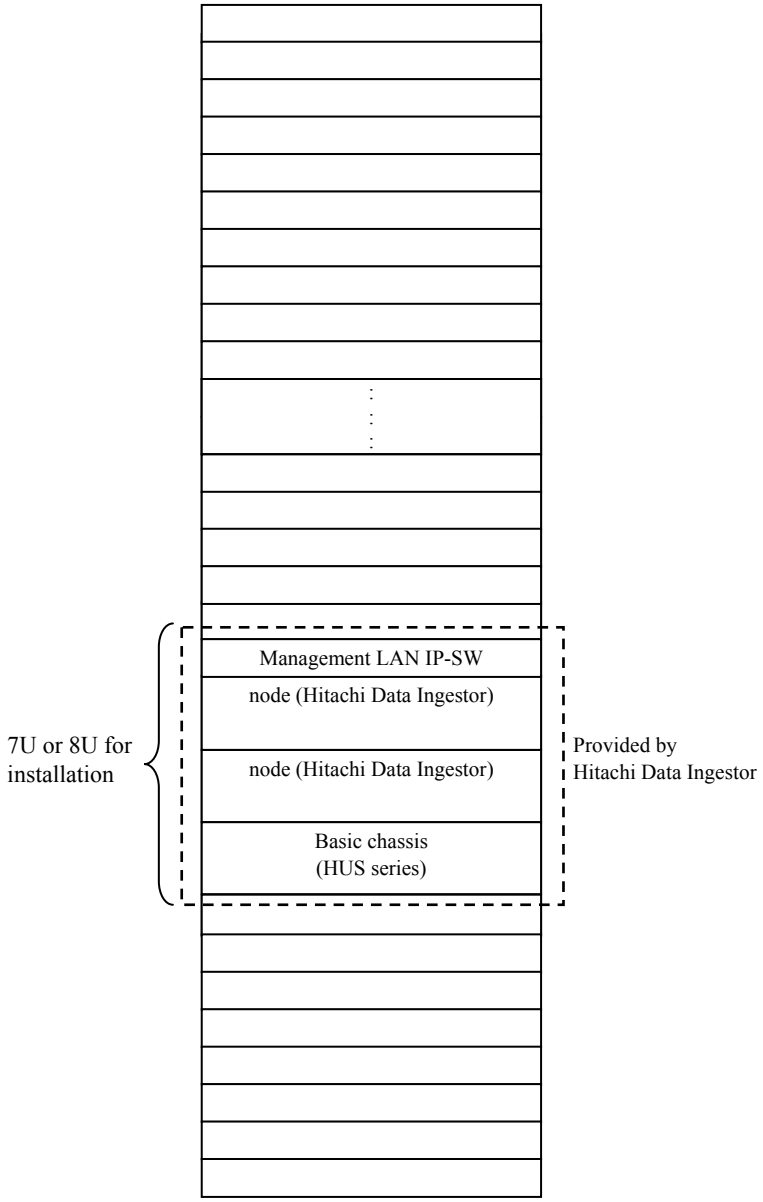

Figure A.4.5-1 Example of Installing the node in the Configuration of HDI for Cloud (cluster node)

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A.4.6 Example of Installing the Node in the Configuration of HDI for Cloud (single node)

CAUTION

To prevent a rack frame fall, install the heavier devices on the lower positions as much as possible. The devices must be installed in the order of a position from the bottom. Please make sure when you install nodes on your rack frame.

Install only a node in the configuration of HDI for Cloud (single node) because any of disk array subsystem, Maintenance LAN IP-SW, KVM is not used for this configuration.

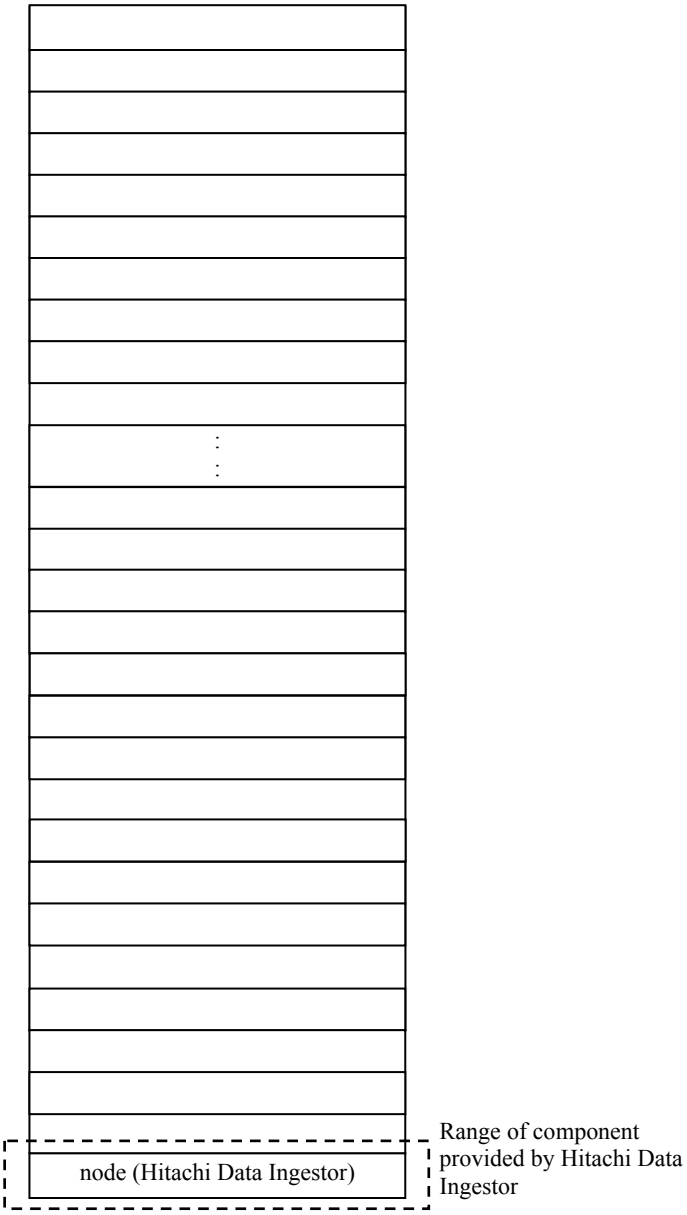

Figure A.4.6-1 Example of installing the node of the configuration of HDI for Cloud (single node)

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CONTENTS

B.1 Connection and Confirmation of OS Console

B.1.1 Confirmation of KVM Connection

B.1.2 Startup Confirmation of the OS by Using KVM

B.1.3 Connection Confirmation of the Remote Console

B.1.4 Startup Confirmation of OS by Using Remote Console

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B.1 Connection and Confirmation of OS Console

There are two methods of connection to the console of OS. One is the connection with KVM, and the other is the connection with remote console.

KVM is an input/output device with a hardware display monitor, and the command operation for the node can be executed. Generally, KVM can connect to multiple nodes and it uses by switching nodes. Note that KVM is not used in this model.

Remote Console is a function that can be executed a command operation for the node on a screen of a maintenance PC by installing the remote console application to the maintenance PC. Remote console uses in the case other than installation operation and BMC failures.

For more details about Remote Console Application, refer to “QuantaGrid Series D51B-2U Technical Guide”.

B.1.1 Confirmation of KVM Connection

Refer to ‘B.1.3 Connection Confirmation of the Remote Console’ in this model.

B.1.2 Startup Confirmation of the OS by Using KVM

Refer to ‘B.1.4 Startup Confirmation of OS by Using Remote Console’ in this model.

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B.1.3 Connection Confirmation of the Remote Console

NOTE: In the case of BMC port failure, borrow a monitor and a keyboard from the system administrator to connect to the node.

The console must be available to use before executing setup operation. Confirm that the following descriptions are connected certainly.

(1) Verify that the power source cable of the maintenance PC is connected.
(2) Verify that the network segment of the BMC port and the network segment of the maintenance PC are the same.

If the network segment is different, change the setting of maintenance PC to be the same network segment. The following shows the conceivable IP address of the BMC port.

- Before the setup (After factory shipping), the IP address may be 192.168.100.100.
- Before the setup (After motherboard replacement), the IP address may be 192.168.0.120.
- After the setup, the IP address may be the following.

  [node0] is [192.168.0.22], and [node1] is [192.168.0.23].

  If the IP address of the BMC port is other than the above IP address, confirm with the system administrator.

(3) Verify that the LAN port of the maintenance PC and the BMC port of the node are connected with a LAN cable (cross-cable).

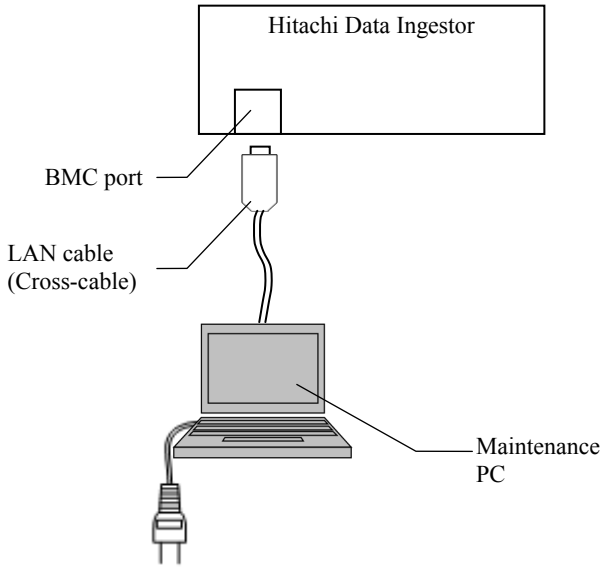

Figure B.1.3-1 Remote console connection example

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B.1.4 Startup Confirmation of OS by Using Remote Console

If the OS is already installed, it is available to check if the OS is running or not with using the console window.

This procedure assumes that the connection confirmation of the console with the description of 'B.1.3 Connection Confirmation of the Remote Console'.

The following shows the procedure.

(1) Start up the Internet Explorer from the maintenance PC.
Click [Start]-[Program]-[Internet Explorer].

(2) Input the following address in the address bar on the Internet Explorer.
"http://<IP address of the BMC>"

Input the IP address confirmed at 'B.1.3 Connection Confirmation of the Remote Console' for the IP address of the BMC.

(3) The MegaRAC GUI login window is displayed.
Refer to "QuantaGrid Series D51B-2U Technical Guide" and log into MegaRAC GUI and start up Remote Console.

NOTE:
- If "LOG: unexpected EOF on client connection" is displayed after "login" in the login screen, press [Enter] key.
- If the maintenance PC is connected to another port on which the same IP address as the one you are trying to connect is set, you might not be able to connect because the information of another port is remained. Start the Windows command prompt on the maintenance PC and run "arp -d <IP address of BMC>" to clear the ARP cache, and then connect to the BMC port.
- If the connection still fails even of the ARP cache is cleared, confirm that no problem with the maintenance PC network and the connection of the LAN cable.

(4) Make sure that Figure B.1.4-1 or Figure B.1.4-2 is displayed. If not displayed, which means either OS is under boot processing / under suspension, or OS has suspended.
If Figure B.1.4-1 has been displayed, go to step (4-1).
If Figure B.1.4-2 has been displayed, go to step (4-2).

(4-1) Press [Enter] key without entering anything in the console window.
Make sure that the same prompt message has been output on the bottom of the login prompt window shown in Figure B.1.4-1.
If the same prompt message is displayed, which means that OS is booing.
If the console window has no response, either OS is hanging up or abnormally stopped.

```
xxxxxxxx(device-serial-number) login:
```

Figure B.1.4-1 Console window

(4-2) Press [Ctrl] + [F2] key and confirm that the window has been switched to the login prompt window.
If the window is switched, OS is booting.
If the window is not switched, either OS is hanging up or abnormally stopped.

```
(Hint: Press Ctrl + F2 to go to the Login screen.)

xxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxx
```

Figure B.1.4-2 Console window 2

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B.2 BIOS Setting

B.2.1 BIOS Version Checking Procedure
B.2.2 BMC Firmware Version Checking Procedure
B.2.3 BOOT Priority Order
B.2.4 Set the Time in BIOS
B.2.5 BMC Setting Procedure
B.2.6 RAID Controller Setting
B.2.6.1 Virtual disk setting confirmation
B.2.6.2 Virtual disk setting procedure
B.2.6.3 RAID controller setting procedure
B.2.7 Confirmation of CPU Virtualization Support Mechanism
B.2.8 Virtual Drive Consistency Checking Procedure
B.2.9 Other Setting/Confirmation Items

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B.2 BIOS Setting

This chapter describes the BIOS setting of motherboard and RAID controller.

For the items that use BIOS Setup Utility in the confirmation or the setting changes of the motherboard, refer to Table B.2-1 and Table B.2-2 on the next page. For the items that do not use BIOS Setup Utility, refer to ‘B.2.9’.

For the confirmation items or the setting items to be changed of RAID controller, refer to ‘B.2.6’ or ‘B2.8’.

Table B.2-1 List of BIOS Setting Items of Motherboard 1

BIOS Setup Utility (*1)			parts replacement		installation (*4)
menu	setup item	Description	MB (*2)	BT (*3)	
Main					
	Project Version	Check the value.	✓		
Server Mgmt					
	BMC Firmware Revision	Check the value.	✓		

*1: Project Version: It is the menu and the setup item for Setup Utility of S2B_3A19.
*2: It is the item that the confirmation and the setting change are required when replacing the motherboard.
*3: It is the item that the confirmation and the setting change are required when replacing the Lithium Battery.
*4: It is the item that the confirmation and the setting change are required at the time of the new installation or the update installation.

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Table B.2-1 List of BIOS Setting Items of Motherboard 2

BIOS Setup Utility (*1) menu / setup item	Description	parts replacement MB (*2)	parts replacement BT (*3)	installation (*4)
Main				
System Date	Enter the acquired date manually by either of the following procedures.(*5) • "Set Up 'Figure 9.1-7 "Date and Time" window 4' (SETUP 09-0030)" • Running the timeget-u command on the other side node. Refer to "Maintenance Tool '2.42 Acquisition of Time/Time Zone (timeget)' (MNTT 02-2430)" for details.	✓	✓	
System Time	Enter the acquired time manually by either of the following procedures. For the time to be set, within 10 seconds are the allowable range. (*5) • "Set Up 'Figure 9.1-7 "Date and Time" window 4' (SETUP 09-0030)" • Running the timeget-u command on the other side node. Refer to "Maintenance Tool '2.42 Acquisition of Time/Time Zone (timeget)' (MNTT 02-2430)" for details.	✓	✓	
Boot				
POST Error Pause	Select "Enabled".	✓	✓	✓
Boot mode Select	Select "LEGACY".	✓	✓	✓
Boot Option	Set as follows. Boot Option #1 CD/DVD Boot Option #2 USB Boot Option #3 Hard Disk Boot Option #4 Disabled Boot Option #5 Disabled	✓	✓	✓
Advanced				
Onboard Device Configuration				
Legacy OpRom Support	For Onboard LAN and OCP Mezz, Card Configuration, select "Disabled".	✓	✓	✓
IntelRCSetup				
Processor Configuration				
Hyper-threading	Select "Disabled".	✓	✓	✓
IIO Configuration				
Intel(R) VT for Directed I/O (VT-d)				
Coherency Support (Non-Isoch)	Select "Disabled".	✓	✓	✓
Coherency Support (Isoch)	Select "Disabled".	✓	✓	✓

*1: Project Version: It is the menu and the setup item for Setup Utility of S2B_3A19.
*2: It is the item that the confirmation and the setting change are required when replacing the motherboard.
*3: It is the item that the confirmation and the setting change are required when replacing the Lithium Battery.
*4: The items that need the confirmation and setting change before performing the new installation and the update installation. Check not only BOOT priority order but also other items.
*5: The timeget command can be used when replacing the parts in the cluster configuration.

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B.2.1 BIOS Version Checking Procedure

Refer to “setup item [Project Version]” in ‘Table B.2-1 List of BIOS Setting Items of Motherboard 1’.

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B.2.2 BMC Firmware Version Checking Procedure

Refer to “setup item [BMC Firmware Revision]” in ‘Table B.2-1 List of BIOS Setting Items of Motherboard 1’.

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B.2.3 BOOT Priority Order

Refer to “setup item [Boot Option]” in ‘Table B.2-1 List of BIOS Setting Items of Motherboard 2’.

Even if the instruction to refer to “B.2.3 BOOT Priority Order (3)” is given, refer to “setup item [Boot Option]” in ‘Table B.2-1 List of BIOS Setting Items of Motherboard 2’.

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B.2.4 Set the Time in BIOS

Refer to “setup item [System Date] and [System Time]” in ‘Table B.2-1 List of BIOS Setting Items of Motherboard 2’.

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B.2.5 BMC Setting Procedure

The setting procedure of BMC is unnecessary for the model: D51B-2U.

Return to the caller of the BMC setting procedures and execute the rest of the operations.

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B.2.6 RAID Controller Setting

For the RAID controller setting, refer to 'B.2.6.3 RAID controller setting procedure'.

B.2.6.1 Virtual disk setting confirmation

The setting confirmation procedure of virtual disk setting is unnecessary for the model: D51B-2U.

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B.2.6.2 Virtual disk setting procedure

The setting procedure of virtual disk setting is unnecessary for the model: D51B-2U.

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B.2.6.3 RAID controller setting procedure

The procedure (1) describes how to confirm the RAID controller version and the procedure (2) describes how to change the settings.

(1) Confirming the RAID controller version

NOTE: Open the console window of KVM or the remote console window, and then execute the step (a). For connecting and confirming KVM or the remote console, refer to 'B.1 Connection and Confirmation of OS Console.'

(a) Stop the OS of the node with referring to "Installation '2.1 Procedure for Turning on and off the Power' (INST 02-0000)". If the LED of power button is turned off, execute the procedure step (b).

(b) Start the OS of the node with referring to "Installation '2.1 Procedure for Turning on and off the Power' (INST 02-0000)".

(c) When the startup message shown in Figure B.2.6.3-1-1 MegaRAID Configuration Utility is displayed in a while after the node starts, press the [Ctrl] + [R] keys within five seconds.
If the buttons are not pressed, go to Step (c-1). If the buttons are pressed, go to Step (d).

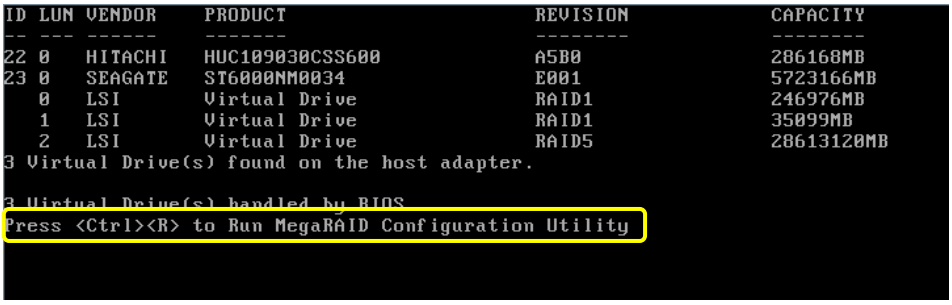

Figure B.2.6.3-1-1 MegaRAID Configuration Utility Startup Message

(c-1) If the [Ctrl] + [R] keys are not pressed, perform from Step (a) again after completing the node startup.

(d) The Virtual Drive Management window is displayed as shown in Figure B.2.6.3-1-2.
Switch to Properties tab by the [Ctrl] + [N] keys.

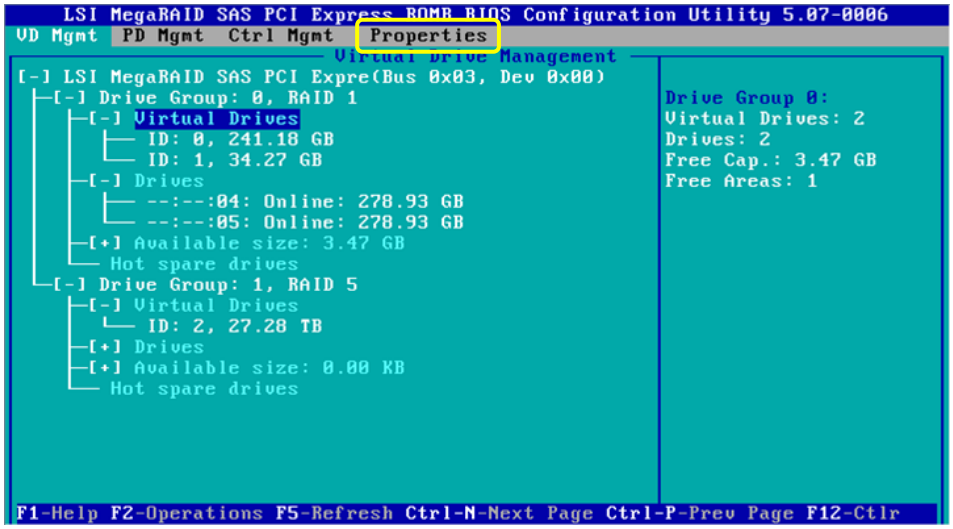

Figure B.2.6.3-1-2 Virtual Drive Management window

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(f) The Properties window is displayed as shown in Figure B.2.6.3-1-3.
Confirm [FW Version] and [BIOS Version].

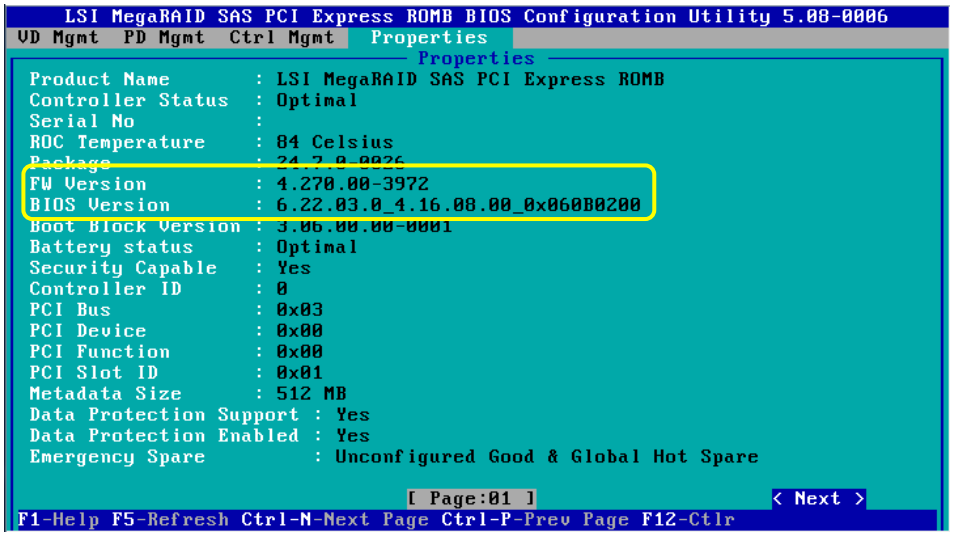

Figure B.2.6.3-1-3 Properties window

(g) When the [Esc] key is pressed, a confirmation message that confirms the completion of MegaRAID Configuration Utility is displayed. Select [OK] by either the [Tab] key or the [↑][↓] keys, and then press the [Enter] key.

Figure B.2.6.3-1-4 Utility Completion Confirmation window

(h) The reset page window is displayed as shown in Figure B.2.6.3-1-5. Press the power button to turn off the power of the node.
For the location of the power button, refer to 'A.2.1 Front side'.

Figure B.2.6.3-1-5 Reset Page window

(i) Return to the caller and execute the rest of the operations.

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(2) Changing RAID controller settings

NOTE: Open the console window of KVM or the remote console window, and then execute the step (a). For connecting and confirming KVM or the remote console, refer to 'B.1 Connection and Confirmation of OS Console.'

(a) Stop the OS of the node with referring to "Installation '2.1 Procedure for Turning on and off the Power' (INST 02-0000)". If the LED of power button is turned off, execute the procedure step (b).

(b) Start the OS of the node with referring to "Installation '2.1 Procedure for Turning on and off the Power' (INST 02-0000)".

(c) When the startup message shown in Figure B. 2.6.3-2-1 MegaRAID Configuration Utility is displayed in a while after the node starts, press the [Ctrl] + [R] keys within five seconds.
If the buttons are not pressed, go to Step (c-1). If the buttons are pressed, go to Step (d).

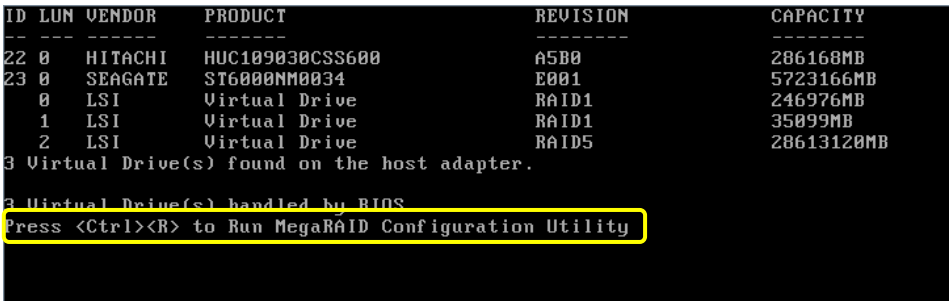

Figure B.2.6.3-2-1 MegaRAID Configuration Utility Startup Message

(c-1) If the [Ctrl] + [R] keys are not pressed, perform from Step (a) again after completing the node startup.

(d) The Virtual Drive Management window is displayed as shown in Figure B.2.6.3-2-2.
Switch to Ctrl Mgmt tab by the [Ctrl] + [N] keys.

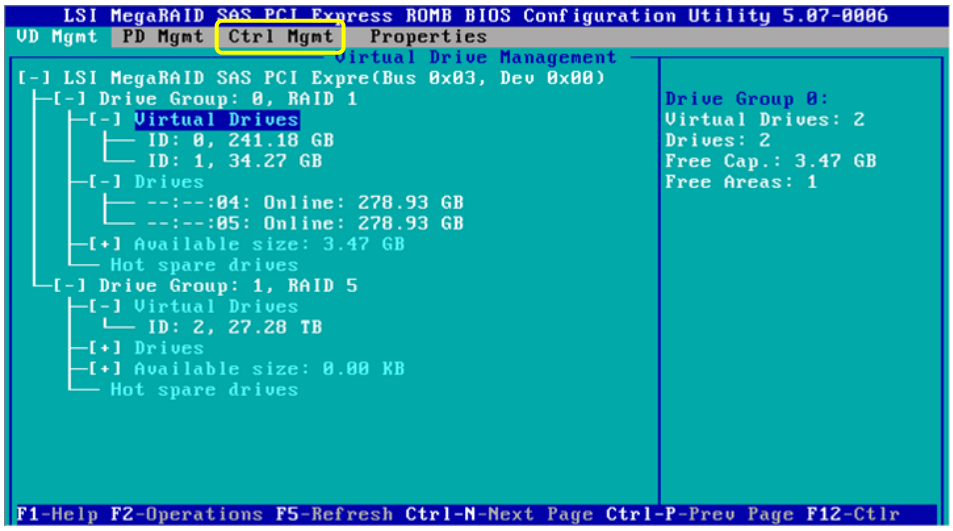

Figure B.2.6.3-2-2 Virtual Drive Management window

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(e) The Controller Settings window is displayed as shown in Figure B.2.6.3-2-3.
If other than “Pause On E” is displayed in BIOS Mode, go to Step (e-1). If “Pause On E” is displayed, go to Step (f).

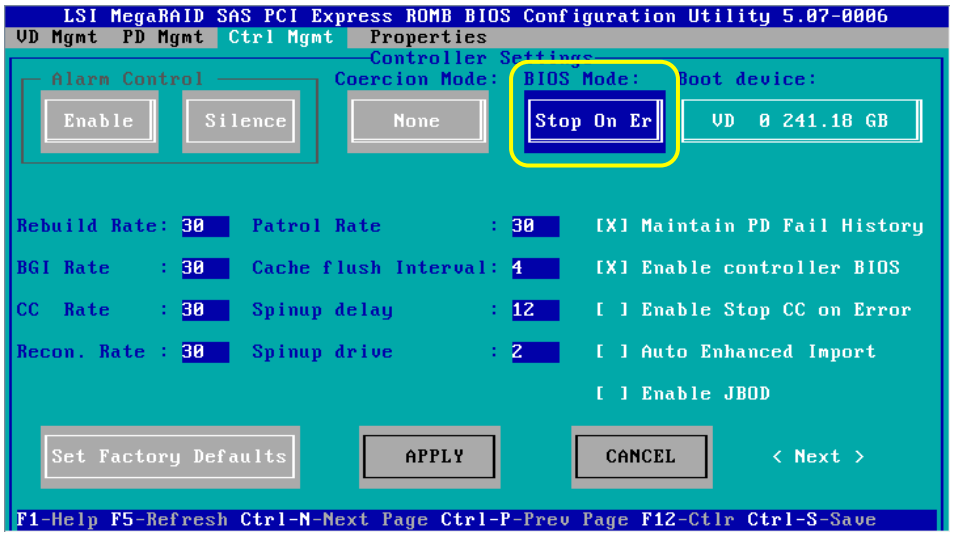

Figure B.2.6.3-2-3 Controller Settings window 1

(e-1) Select [BIOS Mode] by either the [Tab] key or the [↑][↓] keys, and then press the [Enter] key.
Figure 2.6.3-2-4 BIOS Mode Selection is displayed.
Select “Pause on Errors” by the [↑][↓] keys, and then press the [Enter] key. Go to Step (e-2).

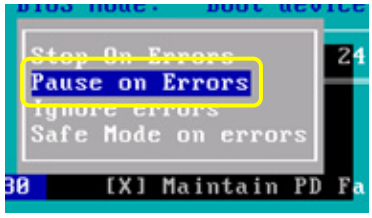

Figure B.2.6.3-2-4 BIOS Mode Selection

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(e-2) Confirm that “Pause On E” is displayed in [BIOS Mode].
Select [APPLY] by either the [Tab] key or the [↑][↓] keys, and then press the [Enter] key.
Go to Step (f).

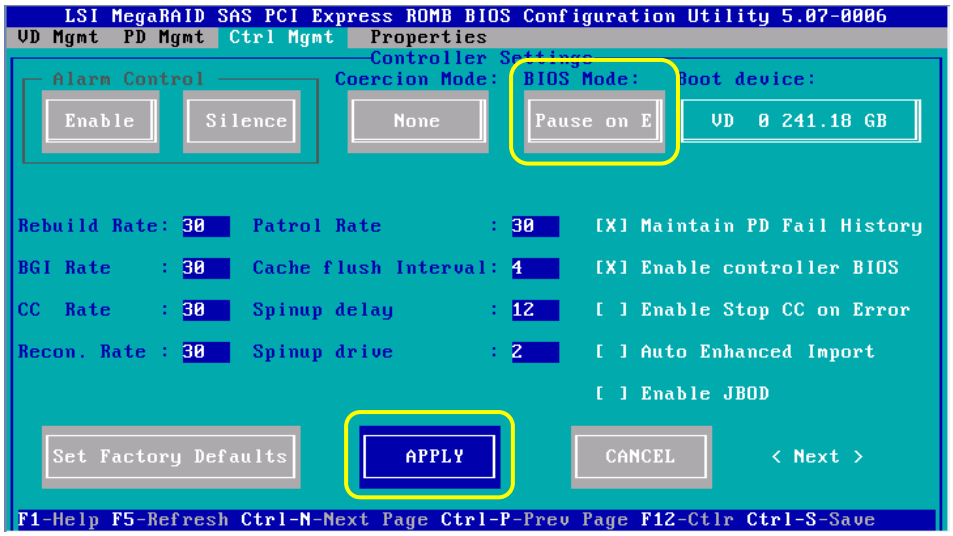

Figure B.2.6.3-2-5 Controller Settings window 2

(f) Select < Next > by either the [Tab] key or the [↑][↓] keys, and then press the [Enter] key.

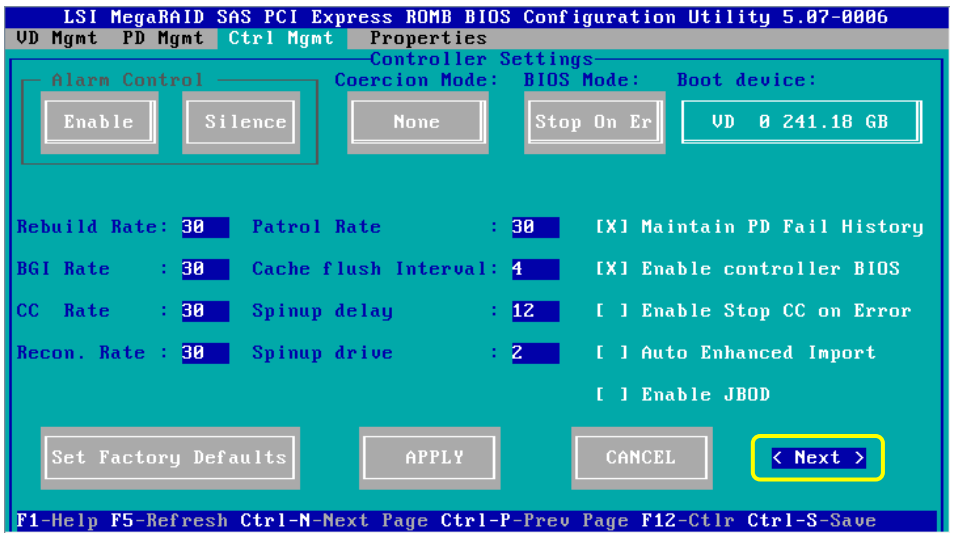

Figure B.2.6.3-2-6 Controller Settings window 3

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(g) The Controller Settings window is displayed as shown in Figure B.2.6.3-2-7.
Select Manage Power Save by either the [Tab] key or the [↑][↓] keys, and then press the [Enter] key.

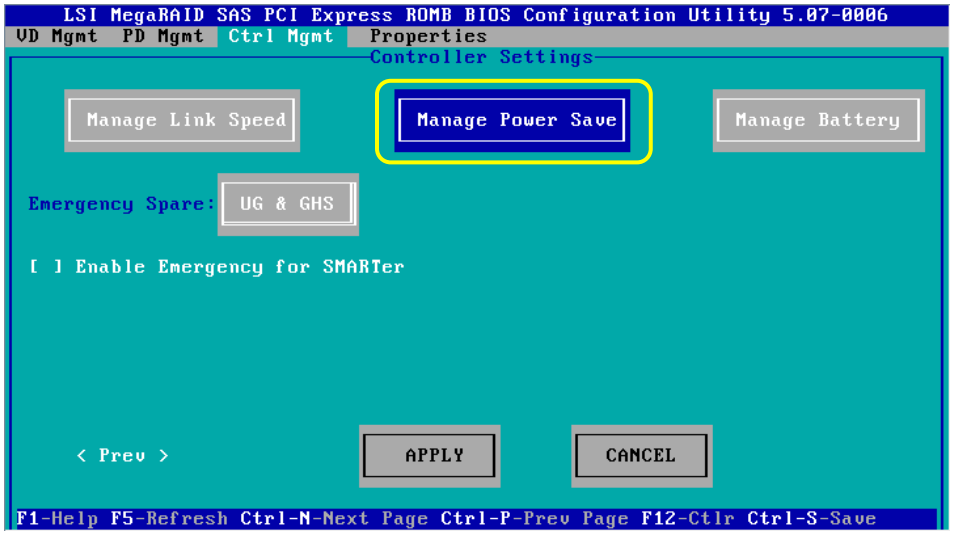

Figure B.2.6.3-2-7 Controller Settings window 4

(h) The Manage Power Save window is displayed as shown in Figure B.2.6.3-2-8.

When the Spin down Unconfigured drives box or the Spin down Hot Spares box is checked, select each item by either the [Tab] key or the [↑][↓] keys, and then press the [Enter] key to uncheck.

Confirm that the Spin down Unconfigured drives box and the Spin down Hot Spares box are unchecked, and then select [OK] by either the [Tab] key or the [↑][↓] keys and press the [Enter] key.

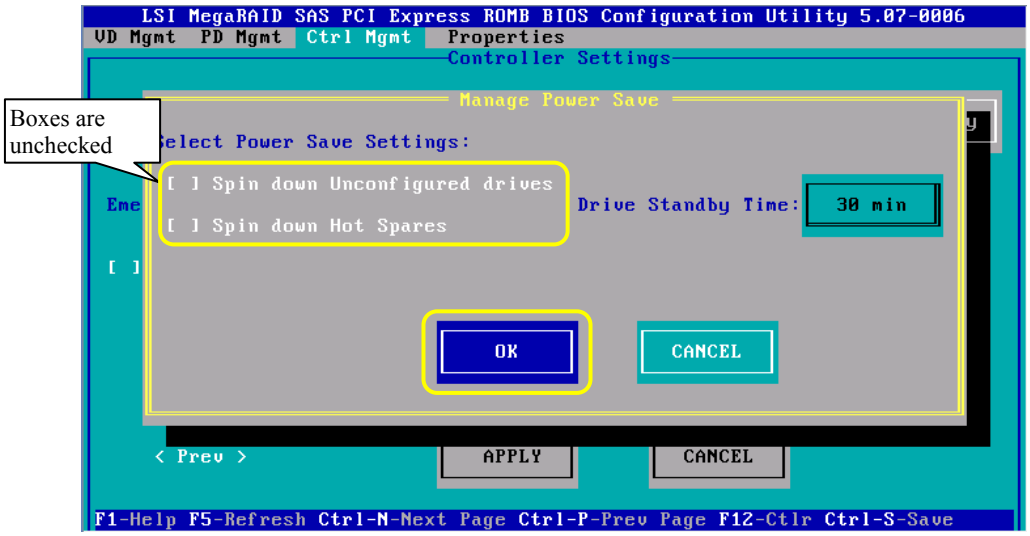

Figure B.2.6.3-2-8 Manage Power Save window

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(i) When the [Esc] key is pressed, a message to confirm the completion of MegaRAID Configuration Utility is displayed.
Select [OK] by either the [Tab] key or the [↑][↓] keys, and then press the [Enter] key.

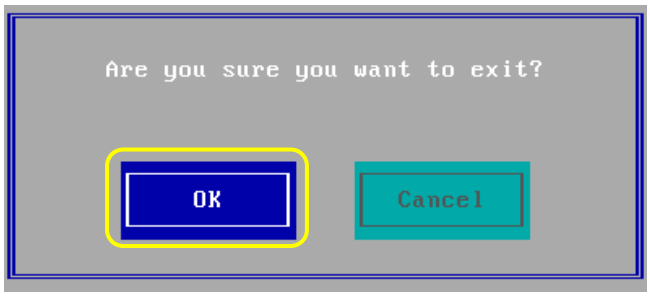

Figure B.2.6.3-2-9 Utility Completion Confirmation window

(j) The reset page window is displayed as shown in Figure B.2.6.3-2-10. Press the power button to turn off the power of the node.
For the location of the power button, refer to 'A.2.1 Front side'.

Figure B.2.6.3-2-10 Reset Page window

(k) Return to the caller and execute the rest of the operations.

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B.2.7 Confirmation of CPU Virtualization Support Mechanism

Refer to “setup item [Hyper-threading]” in ‘Table B.2-1 List of BIOS Setting Items of Motherboard 2’.

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B.2.8 Virtual Drive Consistency Checking Procedure

The procedure (1) shows how to perform the Consistency Check.

The procedure (2) shows how to confirm and disable the schedule of the Consistency Check.

(1) Performing the Consistency Check

NOTE: Open the console window of KVM or the remote console window, and then execute the step (a). For connecting and confirming KVM or the remote console, refer to 'B.1 Connection and Confirmation of OS Console.'

(a) Stop the OS of the node with referring to "Installation '2.1 Procedure for Turning on and off the Power' (INST 02-0000)". If the LED of power button is turned off, execute the procedure step (b).

(b) Start the OS of the node with referring to "Installation '2.1 Procedure for Turning on and off the Power' (INST 02-0000)".

(c) When the startup message of MegaRAID Configuration Utility is displayed in a while after the node starts, press the [Ctrl] + [R] keys within five seconds.
If the buttons are not pressed, go to Step (d). If the buttons are pressed, go to Step (e).

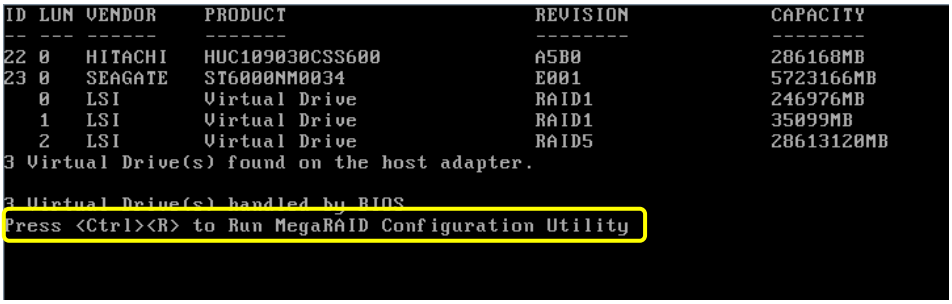

Figure B.2.8-1-1 MegaRAID Configuration Utility Startup Message

(d) If the [Ctrl] + [R] keys are not pressed, perform from Step (a) again after completing the node startup.

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(e) The Virtual Drive Management window is displayed as shown in Figure B.2.8-2. Switch to Ctrl Mgmt tab by the [Ctrl] + [N] keys.

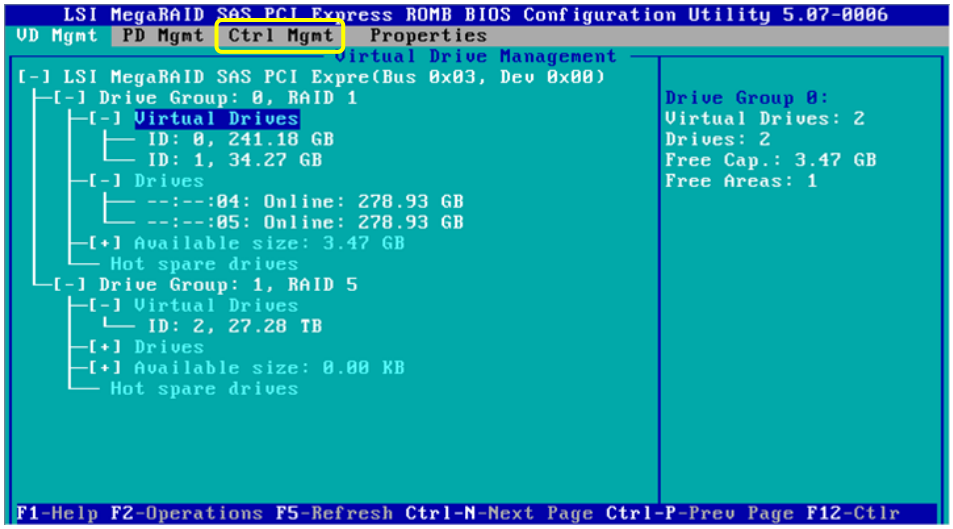

Figure B.2.8-1-2 Virtual Drive Management window 1

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(f) The Controller Settings window is displayed as shown in Figure B.2.8-1-3.
Confirm that the Enable Stop CC on Error box is checked. If it is unchecked, select Enable Stop CC on Error by either the [Tab] key or the [↑][↓] keys, and then press the [Enter] key to check the box.
When the Enable Stop CC on Error box is checked, select [APPLY] by the [Tab] key or the [↑][↓] keys, and then press the [Enter] key, go to Step (d)

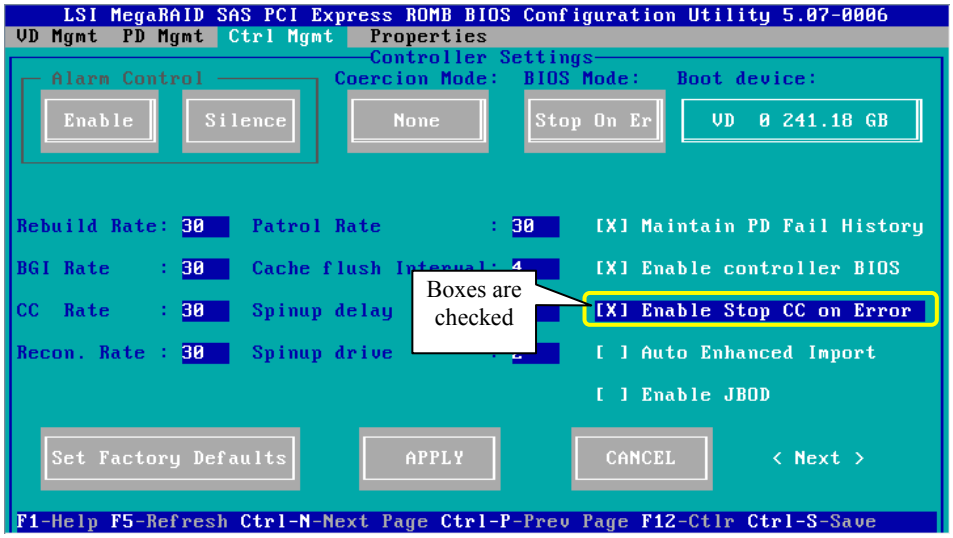

Figure B.2.8-1-3 Controller Settings window 1

(g) Switch to VD Mgmt tab by the [Ctrl] + [N] keys.

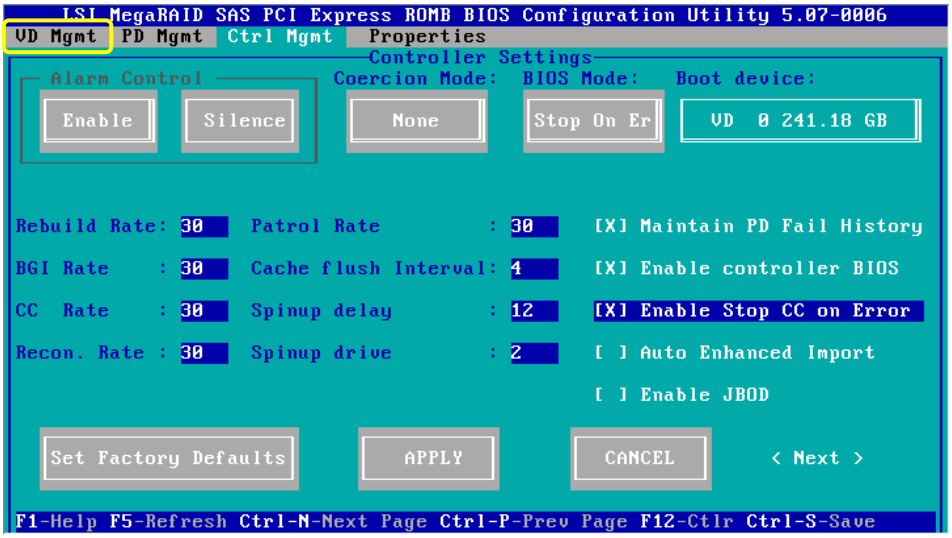

Figure B.2.8-1-4 Controller Settings window 2

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(h) Select Virtual Drive other than [Drive Group: 0] with the [Tab] key or the [↑][↓] keys, and then press the [F2] key. When the Operation items are displayed, select “Consistency Check” by the [↑][↓] keys and press the [Enter] key. Also, select “Start” by the [↑][↓] keys and press the [Enter] key.

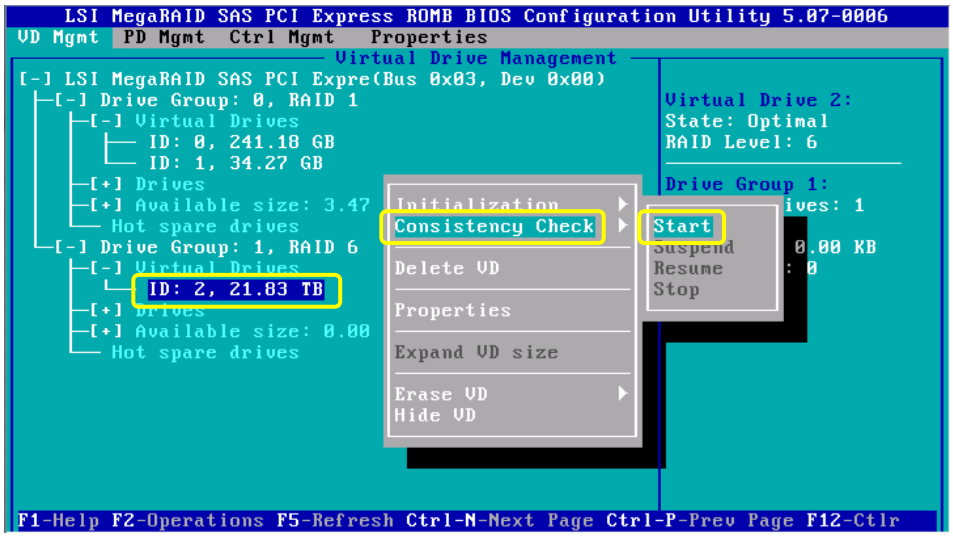

Figure B.2.8-1-5 Virtual Drive Management window 2

(i) Confirm that “Operation : CC” is displayed on the right side of the Virtual Drive Management window.

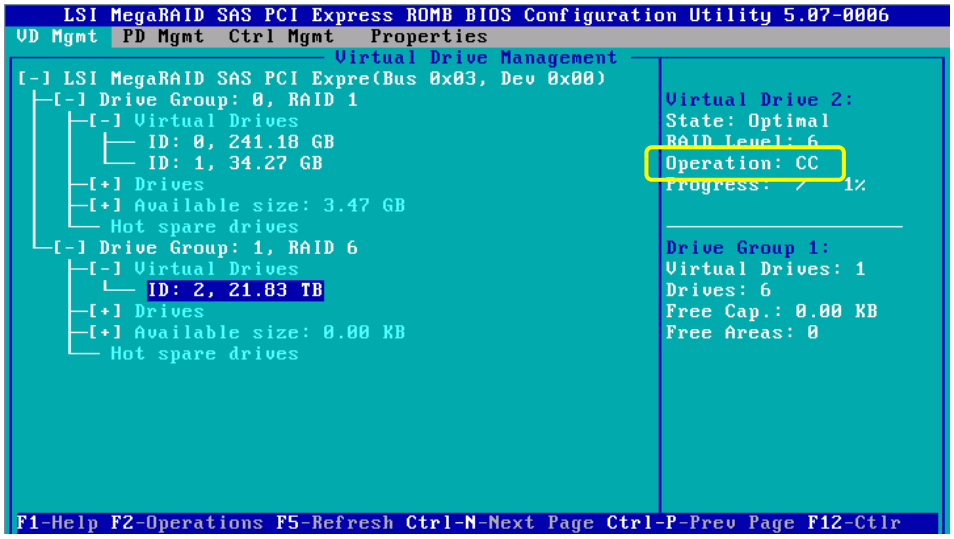

Figure B.2.8-1-6 Virtual Drive Management window 3

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(j) Finish MegaRAID Configuration Utility

(j-1) When the [Esc] key is pressed, a message to confirm the completion of MegaRAID Configuration Utility is displayed.
Select [OK] by either the [Tab] key or the [↑][↓] keys, and then press the [Enter] key.

Figure B.2.8-1-7 Utility Completion Confirmation window

(j-2) The reset page window is displayed as shown in Figure B.2.8-1-8. Press the power button to turn off the power of the node.
For the location of the power button, refer to 'A.2.1 Front side'.

Figure B.2.8-1-8 Reset Page window

(j-3) Return to the caller and execute the rest of the procedures.

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(2) Confirming and disabling the schedule of the Consistency Check

NOTE: Open the console window of KVM or the remote console window, and then execute the step (a). For connecting and confirming KVM or the remote console, refer to 'B.1 Connection and Confirmation of OS Console.'

(a) Start the BIOS Setup Utility.

(a-1) Stop the OS of the node with referring to "Installation '2.1 Procedure for Turning on and off the Power' (INST 02-0000)". If the LED of power button is turned off, execute the procedure step (a-2).

When the main menu window is already displayed, proceed to step (b).

(a-2) Start the OS of the node with referring to "Installation '2.1 Procedure for Turning on and off the Power' (INST 02-0000)".

(a-3) If "Press <DEL> or <F2> to enter setup" is displayed under the console window while the OS of the node is starting up, press the [Delete] key or the [F2] key.

If the [Delete] key or the [F2] key is not pressed, perform from Step (a-1) again after completing the node startup.

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(b) Confirm the Boot mode select.

(b-1) If [Boot mode select] in the [Boot] menu window shown in Figure B.2.8-2-1 is “UEFI”, go to step (c). If it is “LEGACY”, change it to “UEFI” first, and then go to step (b-2).

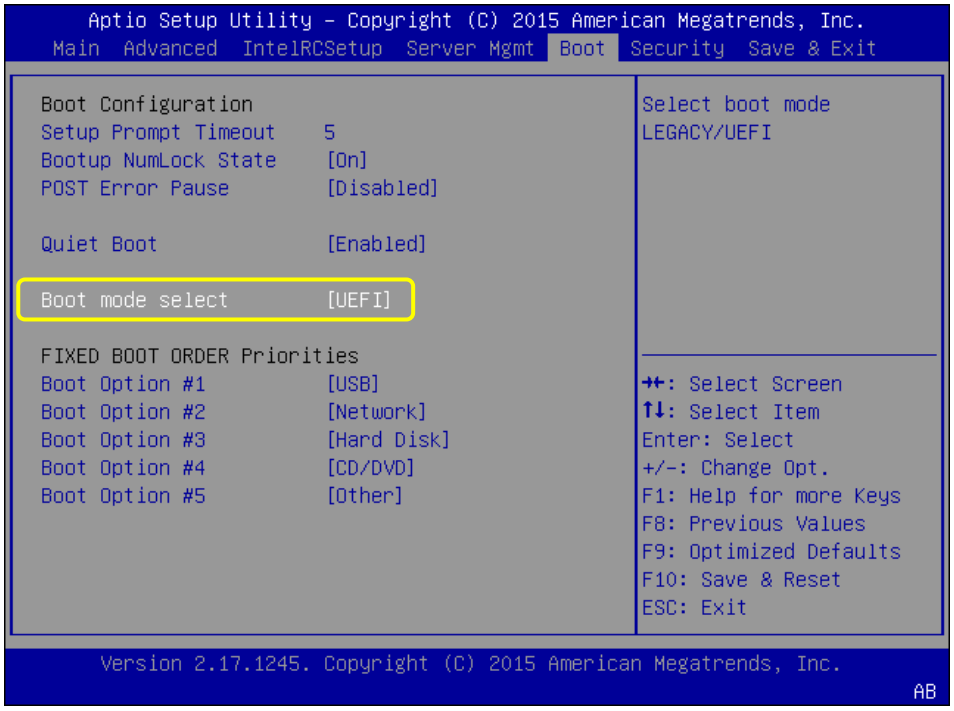

Figure B.2.8-2-1 Boot Menu window 1

NOTE: For the detailed operation method of BIOS Setup Utility, refer to “D51B-2U Technical Guide”.

(b-2) Select [Save Changes and Reset] in the [Save & Exit] menu window. Reboot BIOS Setup Utility. Start from Step (a-3).

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(c) Confirm the schedule of the Consistency Check.

(c-1) Select [LSI MegaRAID …] – [Controller Management] – [Advanced Controller Management] – [Schedule Consistency Check] in [Advanced] menu window.

(c-2) Confirm the [Consistency Check] in the Schedule Consistency Check window shown in Figure B.2.8-2-2.
If it is “Disable”, go to Step (e).
If it is other than “Disable”, go to Step (d).

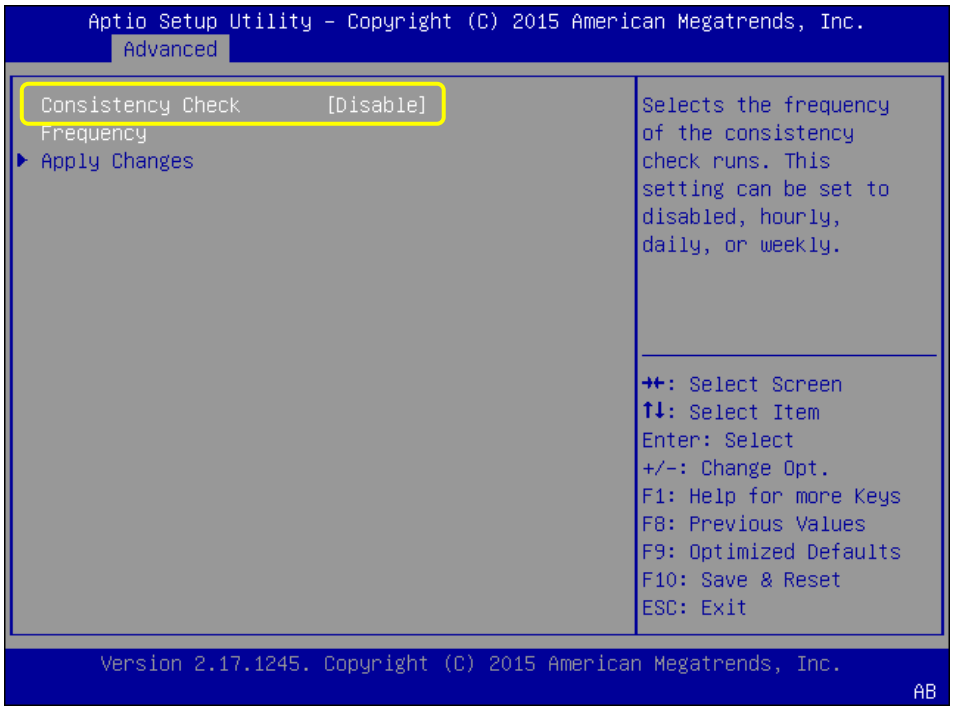

Figure B.2.8-2-2 Schedule Consistency Check window 1

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(d) Disable the schedule of the Consistency Check.
Change [Consistency Check] to “Disable”. Also, select [Apply Changes] - [OK] to apply the change.
After applying the change, go to Step (e).

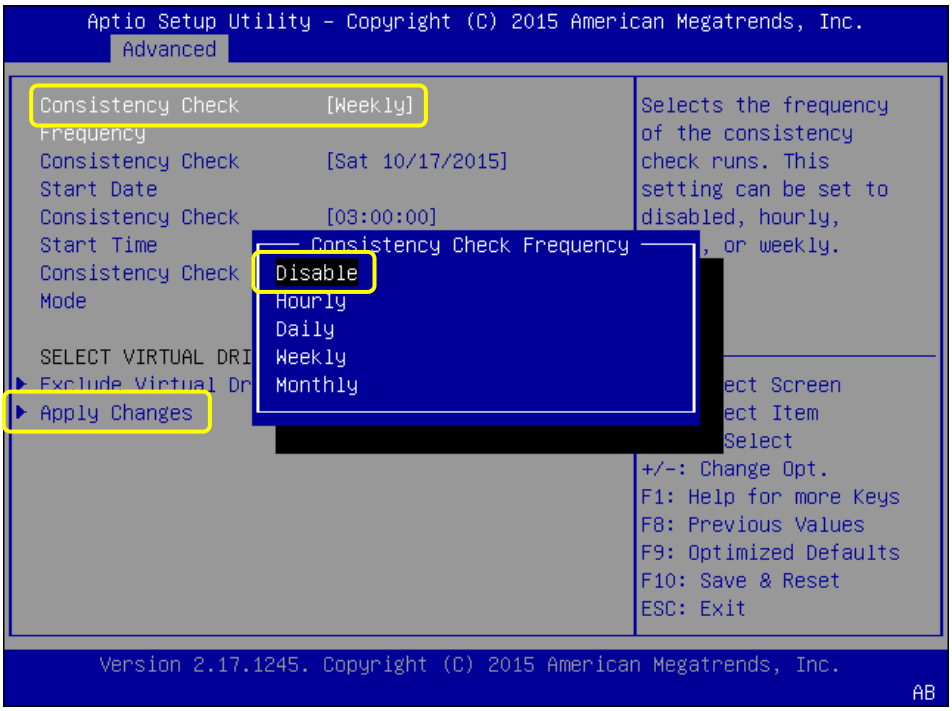

Figure B.2.8-2-3 Schedule Consistency Check window 2

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(e) Change [Boot mode select] to “LEGACY”.
Change [Boot mode select] in the [Boot] menu window shown in Figure B.2.8-2-4 to “LEGACY”.

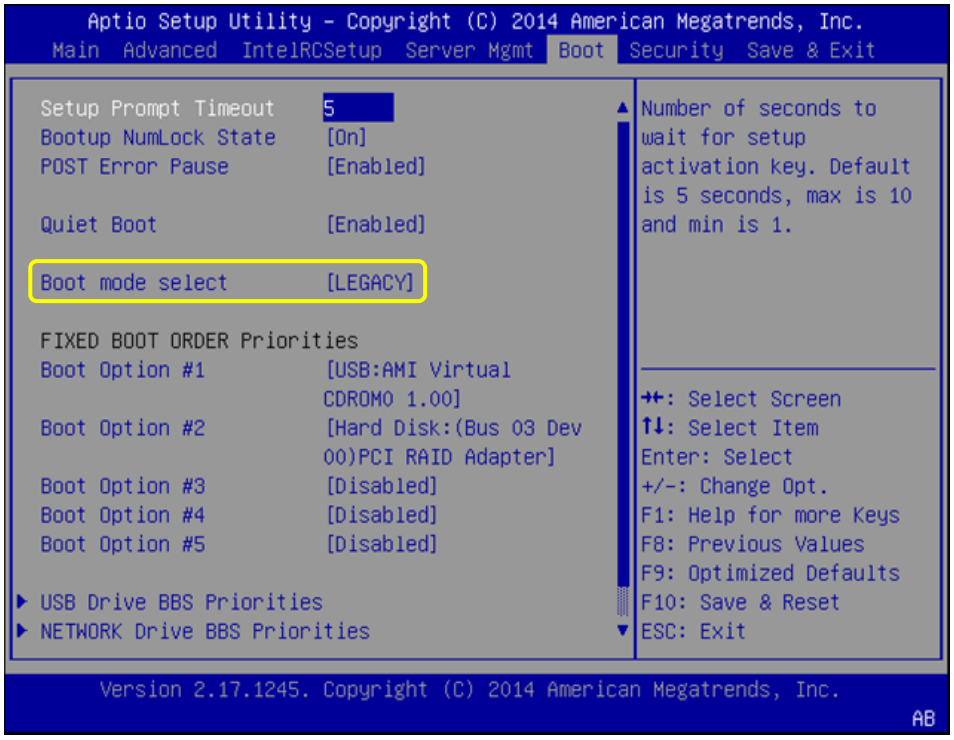

Figure B.2.8-2-4 Boot Menu window 2

(f) Select [Save Changes and Reset] in the [Save & Exit] menu window to reboot the node.

(g) Return to the caller and execute the rest of the operations.

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B.2.9 Other Setting/Confirmation Items

D51B-2U requires additional operations such as confirmation of the following BIOS setting items other than the BIOS setting confirmation described up to B.2.8.

(1) Confirming the Hyper-threading settings.
It is the necessary operation for the motherboard replacement and the lithium battery replacement.

(2) Setting Power supply unit.
It is the necessary operation for the node shipping and the motherboard replacement.

(3) Confirmation of the HBA version.
It is required for shipping of the node and replacing HBA.

The procedures for the above (1) to (3) are shown below.

(1) Confirmation of the setting of Hyper-threading
It is confirmed that the setting of Hyper-threading is [Disabled].

NOTE: If [Hyper-threading] is not displayed in the CPU advanced function setting sub menu window in 'B.2.7 Confirmation of CPU Virtualization Support Mechanism', confirmation of the setting of Hyper-threading is not necessary.

(a) Log in to the node to be maintained from the maintenance PC.
Refer to "Maintenance Tool '1.3 Procedures for Operating Commands' (MNTT 01-0200)" for Login.

(b) Execute "mpstat -P ALL". The execution example is shown in Figure B.2.9-1.
Confirm that the values in the CPU row are "all" or the numbers from 0 to 11.

If there is a number greater than or equal to 12 in the CPU row, Hyper-threading must be set to Enabled.
Execute "B.2.7 Confirmation of CPU Virtualization Support Mechanism" again to set Hyper-threading to [Disabled].

```
$ mpstat -P ALL
Linux 2.6.30.1-HFSL (QTFCJ051400620)    09/18/2015      _x86_64_

04:45:07 PM  CPU   %user   %nice    %sys %iowait    %irq   %soft  %steal   %idle    intr/s
04:45:07 PM  all    0.09    0.00    0.16    0.09    0.00    0.01    0.00   99.66   1198.43
04:45:07 PM    0    0.34    0.00    0.22    0.44    0.02    0.06    0.00   98.93    248.59
04:45:07 PM    1    0.14    0.00    0.20    0.24    0.00    0.00    0.00   99.42      8.72
04:45:07 PM    2    0.07    0.00    0.09    0.08    0.00    0.00    0.00   99.76      7.26
04:45:07 PM    3    0.02    0.00    0.04    0.03    0.00    0.00    0.00   99.91      6.79
04:45:07 PM    4    0.04    0.00    0.06    0.01    0.00    0.00    0.00   99.89      7.28
04:45:07 PM    5    0.03    0.00    0.04    0.03    0.00    0.00    0.00   99.89      7.28
04:45:07 PM    6    0.06    0.00    0.27    0.08    0.00    0.00    0.00   99.58      2.53
04:45:07 PM    7    0.08    0.00    0.14    0.05    0.00    0.00    0.00   99.74      0.00
04:45:07 PM    8    0.12    0.00    0.14    0.05    0.00    0.00    0.00   99.69      0.00
04:45:07 PM    9    0.06    0.00    0.23    0.02    0.00    0.00    0.00   99.69      0.00
04:45:07 PM   10    0.03    0.00    0.17    0.01    0.00    0.00    0.00   99.79      0.00
04:45:07 PM   11    0.06    0.00    0.26    0.01    0.00    0.00    0.00   99.66      0.00
```

Figure B.2.9-1-1 Execution example of the command

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(2) Setting Power supply unit

A default status of BMC does not recognize PSU2. Therefore, PSU2 needs to be recognized when shipping from the factory or replacing a motherboard.

The PSU2 recognition procedure to BMC is as follows.

(2-1) Use [Configuration]-[Power Supply] in MegaRAC GUI, select “Disabled” in [Cold Redundant mode], and then press the [Save] button.
When the message indicating that the settings are changed successfully is displayed, go to Step (2-3).
When the message indicating that the settings are not changed is displayed, go to Step (2-2).

(2-2) Select “Enabled” and press the [Save] button.
Select “Disabled”, and then press the [Save] button.

(2-3) Use [Server Health]-[Sensor Readings] in MegaRAC GUI to confirm that [PSU2 Status] is “Presence Detected”.

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(3) Confirming HBA version

(3-1) Perform item (a) when the OS is terminated or execute (b) when the OS is started.

(a) Start the OS by referring to "Installation '2.1.1 Procedure for turning on the power' (INST 02-0000)".

(b) Restart the OS by referring to "Installation '2.1.3 Procedure for rebooting the OS' (INST 02-0100)".

(3-2) If the following message is displayed while the OS is in operation, press [E] key while holding down the [Alt] key or [Ctrl] key to display the Emulex Utility window.

NOTE: When using Remote console, use either the hold function in [Keyboard] of the menu bar or the button located at the lower right of the Remote console window instead of the [Alt] key and the [Ctrl] key on the keyboard.

```
<Message>
    Press < Alt E> or <Ctrl E> to enter Emulex BIOS Configuration
    utility. Press< s > to skip Emulex BIOS
```

Figure B.2.9-3-1 Emulex BIOS Boot Confirmation Message

(3-3) The Emulex Utility window 1 is displayed as shown in Figure B.2.9-3-2. Press [Enter] key.

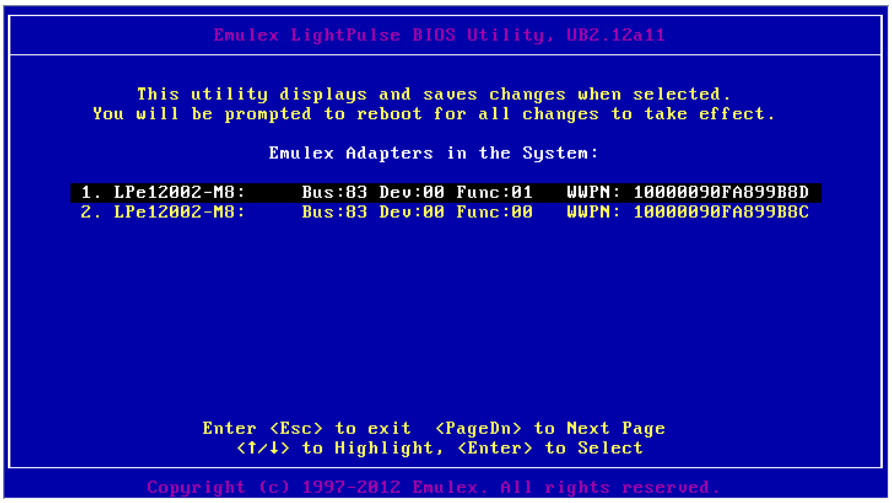

Figure B.2.9-3-2 Emulex Utility window 1

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(3-4) The Emulex Utility window 2 is displayed as shown in Figure B.2.9-3-3.
Confirm the BIOS Version and the Firmware Version. Press the [Esc] key after the confirmation.

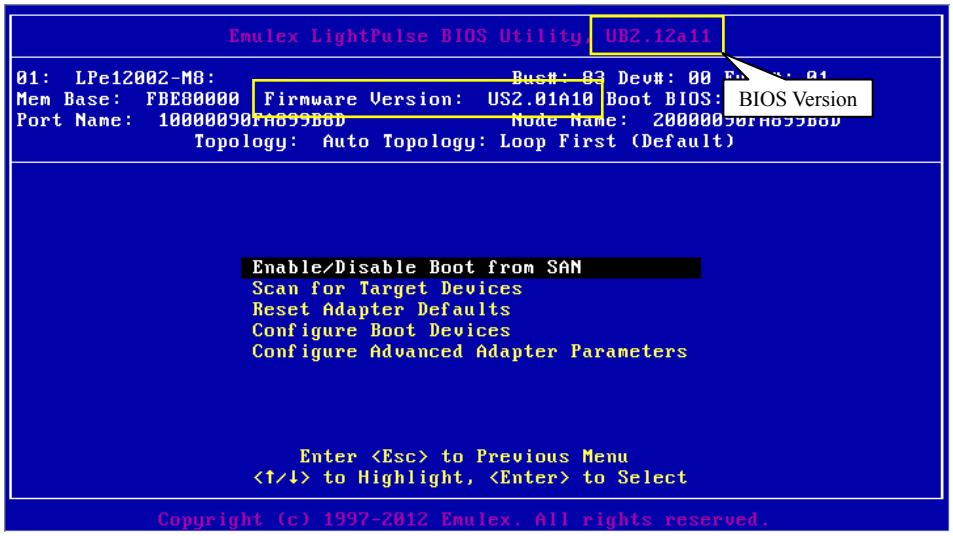

Figure B.2.9-3-3 Emulex Utility window 2

(3-5) The Emulex Utility window 1 is displayed. Press [Esc] key.

(3-6) Reboot Message is displayed as shown in Figure B.2.9-3-4.
A reboot starts when the [Y] key is pressed.

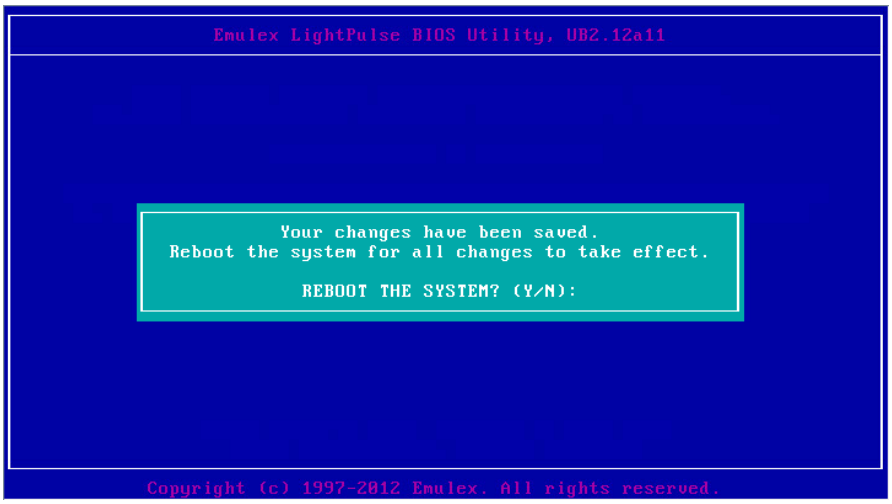

Figure B.2.9-3-3 Reboot Message

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B.3 Maintenance CLI

B.3.1 Displaying the Hardware Status (hwstatus)

The hwstatus command displays the hardware status of the node.

B.3.1.1 Command line

The command line of the hwstatus command can use the following options.

hwstatus [-h]

Table B.3.1.1-1 shows the description of the options.

Table B.3.1.1-1 Command Options

No.	Option	Description	Remarks
1	-h	Displays the format of the command.	—

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B.3.1.2 Output format

The output format at the time of hwstatus command execution is shown in Figure B.3.1.2-1, and the contents of the output format are shown in Table B.3.1.2-1.

```
Output format of hwstatus

Model Information                                                                   1
 Quanta Computer Inc  D51B-2U (dual 10G LoM)
SerialNumber Information                                                            2
 QTFCJ05140062
Fan Information                                                                     3
 0          ok                  -
 1          failed              -
 (Repeat for the number of cooling fan unit)
Temperature Information                                                             4
 0          ok                  reading:33_(+/-_1)_degrees_C
 (Repeat for the number of temperature sensor.)
PowerSupply Information                                                             5
 0          ok                  -
 1          failed              -
Memory Information                                                                  6
 0          installed           locator: CPUX_DIMMXX,size:YYYY_MB
 1          not_installed       locator: CPUX_DIMMXX,size:-
 (Repeat for the number of DIMMs)
MemoryTotal Information                                                             7
 0          -                   size: 5.5  GB(6.0  GB)
InternalHDD Information                                                             8
 0          ok                  size:XXX.XXX_GB,raid_level:RAIDX,media_error:0,predictive_failure:0
 1          failed              size:XXX.XXX_GB,raid_level:RAIDX,media_error:0,predictive_failure:0
InternalRAIDBattery Information                                                     9
 -          -                   -
BMC Information                                                                     10
 status     ok
 connection ok
Network Interface                                                                   11
 mng0       up                  linkspeed: XXXXBase,mediatype:Copper,Management port
 hb0        down                linkspeed: XXXXBase,mediatype:Copper,Heartbeat port
 (Repeat for the number of port names)
FC Port Information                                                                 12
 fcXXXX     up      wwpn: xxxxxxxxxxxxxxxx, linkspeed:8_Gbit
 fcXXXX     up      wwpn: xxxxxxxxxxxxxxxx, linkspeed:8_Gbit
 (Repeat for the number of port names)
```

Figure B.3.1.2-1 hwstatus Output Format

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Table B.3.1.2-1 Contents of Output Format (1/3)

No.	Item	Description	Remarks
1	Model Information		
	Quanta Computer Inc	Displays the name of manufacturer.	Quanta Computer Inc
	D51B-2U	Displays the name of a product. The product name is shown after the manufacturer.	D51B-2U
2	Serial Number Information		
	XXXXXXXXXXXXX	Displays the serial number of a model.	—
3	Fan Information		
	0, 1, •••	Displays the sequential serial numbers of cooling fan unit.	0 to 7
	ok, failed	Displays the availability of failures of cooling fan unit. (*1)	ok : Normal status failed : Abnormal status Usually everything is “ok”.
	-	Displays the vendor's unique information acquired by the hardware.	Usually displays a hyphen.
4	Temperature Information		
	0, 1, •••	Displays the sequential system thermometer of serial numbers.	0 to 15
	ok, failed	Displays the status of the system temperature. (*1)	ok : Normal status failed : Abnormal status Usually everything is “ok”.
	reading: 33_(+/-_1)_degrees_C	Displays the vendor’s unique information acquired by the hardware.	The format depends on the vendor. (*2)
5	Power Supply Information		
	0, 1	Displays the sequential serial numbers of the power supply unit.	0 to 1
	ok, failed, not_installed	Displays the availability of power supply unit failures. (*1)	ok : Normal status failed : Abnormal status not_installed : Not installed
	-	Displays the vendor’s unique information acquired by the hardware.	Usually displays a hyphen.
6	Memory Information		
	0, 1, •••	Displays the sequential serial numbers of Memories.	0 to 23
	installed, not_installed	Displays the information of DIMM. (*1)	installed : Installed not_installed : Not installed
	locator: CPUX_DIMMXX, size:YYYY_MB	Displays the vendor’s unique information acquired by the hardware.	The format depends on the vendor. (*2)
7	MemoryTotal Information		
	0	Displays the total number of Memory in numerical order.	0
	size: xx_GB(yy_GB)	Displays the vendor’s unique information acquired by the hardware.	Displays the total sum of Memory in GB. By the configuration of the system, the total number of memory may display smaller than the installed memory that is displayed in the parentheses. (*2)

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Table B.3.1.2-1 Contents of Output Format (2/3)

No.	Item	Description	Remarks
8	Internal HDD Information		
	0, 1, ...	Displays the sequential serial numbers of Internal drive.	0 to 13
	ok, rebuild, failed, not_supported	Displays the internal drive status. (*1)	ok : Normal status rebuild : RAID is being rebuilt failed : A hardware failure was detected in the disk. Some disks have failures or do not exist. not_supported : information cannot be get due to no installation of MegaCLI.
	size:XXX.XXX_GB, raid_level:RAIDX, media_error:X,predictive_failure:X	Displays the vendor's unique information acquired by the hardware.	The format is vendor dependent. (*2) media_error:X is "1" in the case that the media error count has exceeded the threshold value. And X is "0" in the case that the media error count has been under the threshold value. A hyphen is displayed in case of an information acquisition failure. predictive_failure:X is "1" in the case that S.M.A.R.T. warnings has exceeded the threshold. And X is "0" in the case that S.M.A.R.T. warnings has been under the threshold. A hyphen is displayed in case of an information acquisition failure.
9	InternalRAIDBattery Information		
	-	Displays the "-".	—
	-	Displays the "-".	—
	-	Displays the "-".	—
10	BMC Information		
	status ok, status Unknown!	Displays this side node BMC status.	ok : Normal status Unknown! : Information acquisition of BMC fails
	connection ok, connection failed, connection none	Displays the other side node BMC connection status.	(*6) ok : Normal status failed : Communication with BMC of the other side node fails. none : Cluster is not built

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Table B.3.1.2-1 Contents of Output Format (3/3)

No.	Item	Description	Remarks
11	Network Interface		
	mng0, hb0, pm0, pm1, ethX, •••	Displays the port name. (*3) (*4)	mng0 : Management port hb0 : Heartbeat port (*8) pm0 : Maintenance port pm1 : Reset port ethX : Data port (1GbE) xgbeX : Data port (10GbE) * X indicates an integer more than or equal to 0. Example: eth1
	up, down	Displays the port status. (*3) (*4)	up : LinkUp down : LinkDown * The port not connecting the cable displays “down”. (*5)
	linkspeed: XXXXBase, linkspeed: Unknown!	Displays the link speed. (*4)	10Base : 10Mbps 100Base : 100Mbps 1000Base : 1Gbps 10000Base: 10Gbps Unknown! : Link speed is unknown
	mediatype:Copper mediatype : Fiber	Displays the media type. (*3) (*4)	Copper : Copper wire Fiber : Fibre wire
	Management port, Heartbeat port, Private maintenance port	Displays the use. (*4)	Management port : In case the port name is “mng0” Heartbeat port : In case the port name is “hb0” Private Maintenance port : In case the port name is “pm0, pm1” * The use is not displayed for other ports.
12	FC Port Information		
	fcXXXX, …	Displays the Fibre Channel port name in ascending order. (*1)	X represents an integer greater than or equal to 0. (Hexadecimal)
	up, down	Displays the port status. (*1)	up : LinkUp down : LinkDown
	wwpn: xxxxxxxxxxxxxxxx	Displays the host port WWN. (*1)	—
	linkspeed:8_Gbit	Displays the link speed. (*1)	1_Gbit : 1Gbps 2_Gblt : 2Gbps 4_Gbit : 4Gbps 8_Gbit : 8Gbps 10_Gbit : 10Gbps 16_Gbit : 16Gbps Unknown! : Displayed during LinkDown or for link speeds that are not supported

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*1: In case of an information acquisition failure, a hyphen is displayed. Note that, even in case of an information acquisition failure, the information already acquired is displayed.
*2: When the vendor's unique information does not exist, a hyphen is displayed.
*3: When the acquisition of the statuses of all pots failed, the Network Interface information is displayed in only one row. In this case, a hyphen is displayed for the port name, the port status, and the media type.
*4: When the acquisition of the status in units of ports fails, the information of the port which failed the acquisition is not displayed.
*5: Unused (unset) data port also displays "down". In this case, check if "(Not used)" is displayed just after the name of interface, by using iflist -v command. To execute this operation, refer to "Maintenance Tool '2.4 Displaying the Network Status (iflist)' (MNTT 02-0200)".
*7: The number differs depending on the configuration.
*8: In case of checking the network setting of hb0, specify the "-v" option for the clstatus command and execute. For details, refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)".

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B.3.1.3 Execution procedure

This subsection describes the procedure for executing the hwstatus command.

(1) Log in to the execution node via ssh from the maintenance PC usually. For the login method, refer to "Maintenance Tool '1.3 Procedures for Operating Commands' (MNTT 01-0200)".

(2) Execute the hwstatus command by each node. Figure B.3.1.3-1 shows display examples at the time of hwstatus execution.
If the hwstatus command terminated abnormally, the hardware status is not displayed, and the message ID is displayed. In this case, refer to 'B.3.1.4 Command termination messages and action to be taken', and take actions.

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```
$ sudo hwstatus
Model Information
 Quanta Computer Inc  D51B-2U (dual 10G LoM)
SerialNumber Information
 QTFCJ05140062
Fan Information
 0          ok            -
 1          ok            -
 2          ok            -
 3          ok            -
 4          ok            -
 5          ok            -
 6          ok            -
 7          ok            -
Temperature Information
 0          ok            reading:37_(+/-_0)_degrees_C
 1          ok            reading:48_(+/-_0)_degrees_C
 2          ok            reading:47_(+/-_0)_degrees_C
 3          ok            reading:38_(+/-_0)_degrees_C
 4          ok            reading:38_(+/-_0)_degrees_C
 5          ok            reading:38_(+/-_0)_degrees_C
 6          ok            reading:42_(+/-_0)_degrees_C
 7          ok            reading:34_(+/-_0)_degrees_C
 8          ok            reading:35_(+/-_0)_degrees_C
 9          ok            reading:31_(+/-_0)_degrees_C
 10         ok            reading:36_(+/-_0)_degrees_C
 11         ok            reading:41_(+/-_0)_degrees_C
 12         ok            reading:44_(+/-_0)_degrees_C
 13         ok            reading:39_(+/-_0)_degrees_C
 14         ok            reading:36_(+/-_0)_degrees_C
 15         ok            reading:32_(+/-_0)_degrees_C
PowerSupply Information
 0          ok            -
 1          ok            -
Memory Information
 0          installed     locator:DIMM_A0,size:16384_MB
 1          not_installed locator:DIMM_A1,size:-
 2          not_installed locator:DIMM_A2,size:-
 3          not_installed locator:DIMM_B0,size:-
 4          not_installed locator:DIMM_B1,size:-
 5          not_installed locator:DIMM_B2,size:-
 6          not_installed locator:DIMM_C0,size:-
 7          not_installed locator:DIMM_C1,size:-
 8          not_installed locator:DIMM_C2,size:-
 9          not_installed locator:DIMM_D0,size:-
 10         not_installed locator:DIMM_D1,size:-
 11         not_installed locator:DIMM_D2,size:-
 12         installed     locator:DIMM_E0,size:16384_MB
 13         not_installed locator:DIMM_E1,size:-
 14         not_installed locator:DIMM_E2,size:-
 15         not_installed locator:DIMM_F0,size:-
 16         not_installed locator:DIMM_F1,size:-
 17         not_installed locator:DIMM_F2,size:-
 18         not_installed locator:DIMM_G0,size:-
 19         not_installed locator:DIMM_G1,size:-
 20         not_installed locator:DIMM_G2,size:-
 21         not_installed locator:DIMM_H0,size:-
 22         not_installed locator:DIMM_H1,size:-
 23         not_installed locator:DIMM_H2,size:-
```

Figure B.3.1.3-1 Display Examples at the time of hwstatus Execution (1/2)

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```
MemoryTotal Information
 0              size:31.1_GB(32.0_GB)
InternalHDD Information
 12             ok             size:279.460_GB,raid_level:RAID1,media_error:0,predictive_failure:0
 13             ok             size:279.460_GB,raid_level:RAID1,media_error:0,predictive_failure:0
InternalRAIDBattery Information
 -              -              -
BMC Information
 status         ok
 connection     ok
Network Interface
 mng0           up             linkspeed: 1000Base,mediatype:Copper,Management port
 hb0            up             linkspeed:  100Base,mediatype:Copper,Heartbeat port
 eth8           down           linkspeed: Unknown!,mediatype:Copper
 eth9           down           linkspeed: Unknown!,mediatype:Copper
 eth10          down           linkspeed: Unknown!,mediatype:Copper
 eth11          down           linkspeed: Unknown!,mediatype:Copper
 xgbe4          down           linkspeed: Unknown!,mediatype:Fiber
 xgbe5          down           linkspeed: Unknown!,mediatype:Fiber
 xgbe8          down           linkspeed: Unknown!,mediatype:Copper
 xgbe9          down           linkspeed: Unknown!,mediatype:Copper
 pm0            down           linkspeed: Unknown!,mediatype:Copper,Private maintenance port
 pm1            down           linkspeed: Unknown!,mediatype:Copper,Private maintenance port
FC Port Information
 fc0002         up             wwpn:10000090fa899b8c,linkspeed:8_Gbit
 fc0003         up             wwpn:10000090fa899b8d,linkspeed:8_Gbit
```

Figure B.3.1.3-1 Display Examples at the time of hwstatus Execution (2/2)

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B.3.1.4 Command termination messages and action to be taken

A message may be displayed when the hwstatus command is executed. Actions to be taken against messages are described in Table B.3.1.4-1 “Message IDs and Actions to be Taken”.

Table B.3.1.4-1 Message IDs and Actions to be Taken

No.	Message ID	Message	Description	Action
1	KAQM14131-E	A syntax error exists in the parameter (<*parameter*>).	The parameter has an error.	Specify the correct parameter, and execute it again.
2	KAQM14134-E	An error occurred in the shared processing of commands. (Error = <*error*>)	An error occurred in the common processing of the command.	Collect the OS log, and send it to the support center. To collect the OS log, refer to “Maintenance Tool ‘2.19 Collecting Logs (oslogget)’ (MNTT 02-1300)”.
3	KAQM14136-I	Usage: <*command-syntax*>	The command format is output.	Not required to be corresponding. Displayed when the –h option is specified. Also displayed continuously when KAQM14131-E is displayed.
4	KAQM14138-E	There are too many or too few parameters.	The parameter has excess or deficiency.	After confirming the format of the command, specify the correct parameter, and execute it again.
5	KAQM14150-E	An error occurred in the system.	An error occurred in the system.	Collect the OS log, and send it to the support center. To collect the OS log, refer to “Maintenance Tool ‘2.19 Collecting Logs (oslogget)’ (MNTT 02-1300)”.
6	KAQM14167-W	MegaCLI, which is required to acquire internal hard disk and battery information, is not installed.	Necessary commands to get the information of the built-in disks and batteries are not installed.	Execute again, by installing necessary commands to get the information of the built-in disks and batteries.

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B.4 Setting Value when the OS is Installed

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B.4 Setting Value when the OS is Installed

The following shows the setting value that is required when installing OS.
After confirming the following table, return to the status before coming to this operation.

Table B.4-1 Setting Value when the OS is Installed

Item	Setting value
Configuration	If no drive is installed in front of the node, it is cluster configuration. If some internal drives are installed in front of the node, it is single node configuration.
User data location	This is not displayed in the cluster configuration. In the single node configuration, select [1. Internal disk.]
Select whether to divide RAID groups for the system LU and for the user LU	Enter “y” (divide.)
RAID rebuilding necessity	This is not displayed in the cluster configuration. In the single node configuration, follow the instruction in the manual because whether RAID rebuilding is necessary or not depends on the recovery procedure.

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B.5 Disk Setting

B.5.1 Acquiring WWNs of Nodes

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B.5 Disk Setting

B.5.1 Acquiring WWNs of Nodes

Acquire WWN of the node set in the HBA BIOS from the console of KVM, LCD, or Remote console.
In the cluster configuration, perform this operation for either node by switching the console.

For connection of KVM and LCD, refer to "Set Up '1.2 Confirmation of KVM Connection' (SETUP 01-0010)" and for connection of Remote console, refer to "Set Up '1.4 Connection Confirmation of the Remote Console' (SETUP 01-0010.)"

(1) Perform item (a) when the OS is terminated or execute (b) when the OS is started.

(a) Start the OS by referring to "Installation '2.1.1 Procedure for turning on the power' (INST 02-0000)".

(b) Restart the OS by referring to "Installation '2.1.3 Procedure for rebooting the OS' (INST 02-0100)".

(2) If the following message is displayed while the OS is in operation, press [E] key while holding down the [Alt] key or [Ctrl] key to display the Emulex Utility window.

NOTE: When using Remote console, the console window is closed by pressing the [E] key while holding down the [Alt] key. Therefore, hold down the [Ctrl] key and press the [E] key.

```
<Message>
    Press < Alt E> or <Ctrl E> to enter Emulex BIOS Configuration
    utility. Press< s > to skip Emulex BIOS
```

Figure B.5.1-1 Boot Confirmation Message of Emulex BIOS

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(3) Take a note of WWN (16-digit alphanumeric characters) displayed at “WWPN:” as shown in Figure B.5.1-2 in the worksheet for a memo of WWN as shown in Table B.5.1-1, and then press [Esc] key.

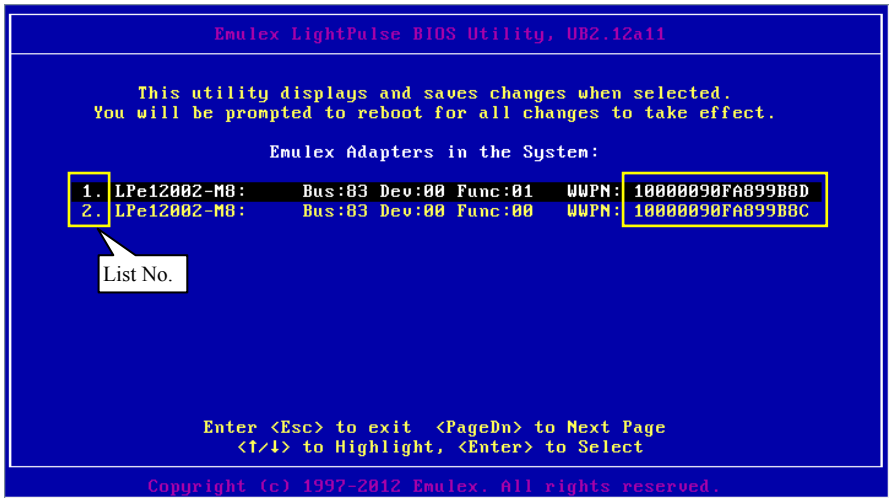

Figure B.5.1-2 Emulex Utility window (example)

NOTE: Columns “List No.1” and “List No.2” in Table B.5.1-1 correspond to the list numbers “1” and “2” in Figure B.5.1-1.

Table B.5.1-1 Example of Writing Worksheet for Memo of WWN when the port number of Node0 is “1”

	List No.1 (*1)	List No.2 (*2)
node0	10000090FA899B8D	10000090FA899B8C
node1		

*1: This corresponds to the port “fc0003” in ‘Figure A.2.2.2-1 Rear View of the Node (Cluster Configuration) (Example.)’

*2: This corresponds to the port “fc0002” in ‘Figure A.2.2.2-1 Rear View of the Node (Cluster Configuration) (Example.)’

(4) Enter “Y” at “REBOOT THE SYSTEM (Y/N);” in the message of Figure B.5.1-3.

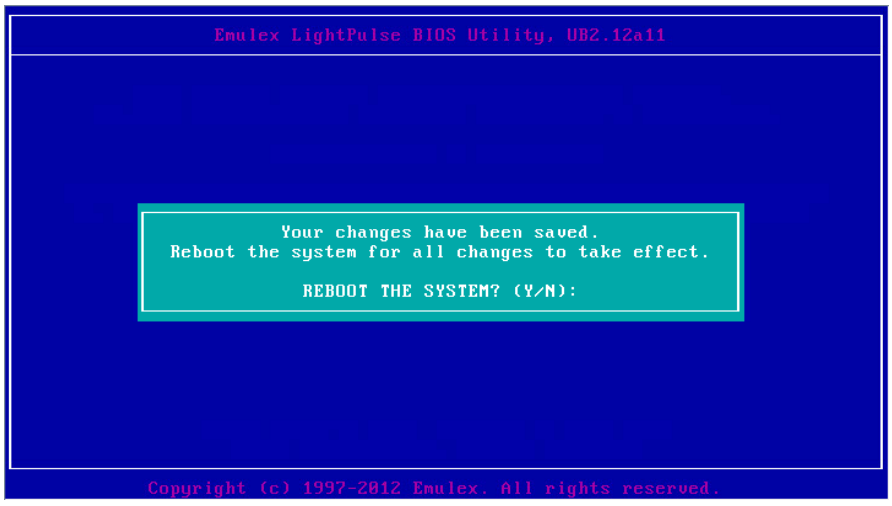

Figure B.5.1-3 Reboot Message

(5) When you enter “Y”, the node is automatically rebooted.

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C.1.4 When the Maintenance Personnel Noticed the Failure at the Time of Initial Installation in the Local Site

C.1.5 Determination Procedure for the Possible Failure Part when a PCI Error Occurred

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C.1 Local Initial Operations According to Maintenance Request

Before troubleshooting, this chapter describes precautions for maintenance personnel to refer to maintenance procedures in “QuantaGrid Series D51B-2U Technical Guide”partly.

Determination of a failure and parts replacement of Hitachi Data Ingestor (HDI) hardware are performed with reference to both the HDI maintenance manual and the “QuantaGrid Series D51B-2U Technical Guide” for which maintenance personnel need to do a certain amount of work in the “QuantaGrid Series D51B-2U Technical Guide” first and return to the work in the HDI maintenance manual.

Figure C.1-1 shows general flow for the maintenance personnel to refer to the proper procedures described in the two maintenance manuals while performing troubleshooting or parts replacement of HDI hardware.

The maintenance personnel must refer to and understand the flow in Figure C.1-1 before performing troubleshooting or parts replacement.

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Troubleshooting or parts replacement policy using two manuals (*)

- ✓ Start a failure determination with HDI maintenance manual.
- ✓ Determine a failure by Event Logs if node is down; determine a failure by SIM of the OS if node is running.
- ✓ Do not refer to the parts replacement procedure of "QuantaGrid Series D51B-2U Technical Guide" from the result of the failure determination of "QuantaGrid Series D51B-2U Technical Guide"; return to the caller of HDI maintenance manual and follow the instruction.
- ✓ If the node did not recover from the failure after part replacement, determine the failure again.

*: "Two manuals" indicates HDI maintenance manual and "QuantaGrid Series D51B-2U Technical Guide".

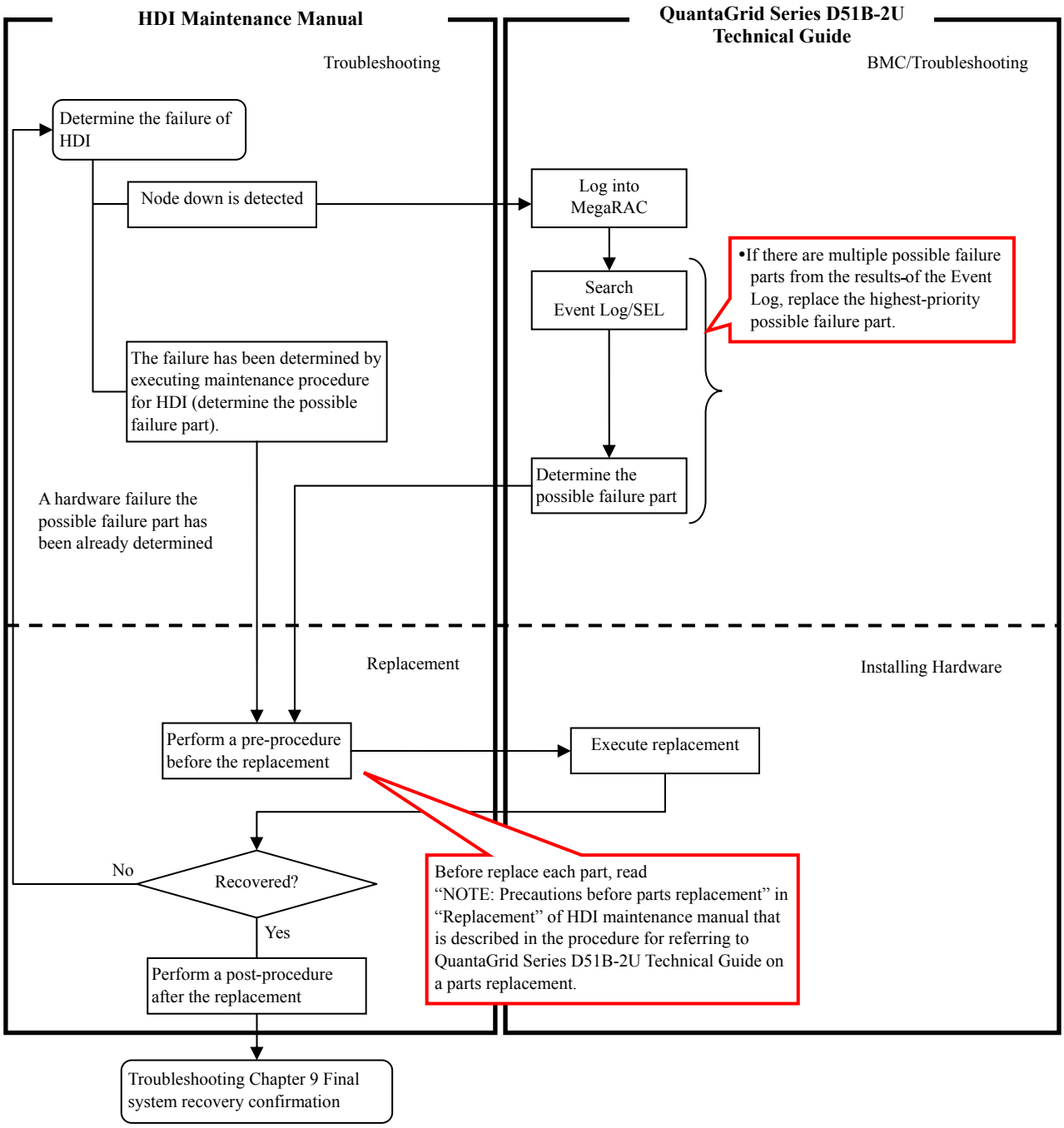

Figure C.1.1 General Flow for Referring to Procedures in Two Manuals

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C.1.1 When Detected by HiTrack

A failure detected by HiTrack is reported to the Maintenance Center of (HDS) by HiTrack. The maintenance personnel should perform the failure analysis according to the following.

(1) Receive the failure information acquired by HiTrack from the Maintenance Center of (HDS) via FTP or e-mail.

(2) Acquire TagID and SIM from the received failure information.
The acquired TagID is used in the failure analysis to specify the failure occurrence node and to replace the parts. The acquired SIM is used in the failure analysis to analyze the failure of Hitachi Data Ingestor.

NOTE: The acquired SIM is the one when the failure occurred or when the communication with the node was disrupted.
Maintenance personnel need to confirm the SIM by connecting the maintenance PC even at the local site.

(3) Based on the acquired TagID and SIM, perform the failure analysis and failure determination operation.
For the details of the failure analysis and the failure determination operation, refer to 'C.2.2 Determination Procedure when a Failure Occurred'.

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C.1.2 When Detected by SNMP Trap

When monitoring by SNMP, a failure detected by HDI is stored in the SNMP Trap server as a failure information equivalent to SIM and reported to the SNMP manager. After that, it is reported to the Maintenance Center of (HDS) by the system administrator. The maintenance personnel should perform the local initial measurement and failure analysis according to the following.

(1) By requesting the system administrator, receive all the SNMP Trap. Maintenance personnel should check the Trap IDs and Trap messages in the received SNMP Trap, and check whether there is a Trap where the SIM of HDI is stored or not. For the details of SNMP Trap where the SIM of HDI is stored, refer to "Troubleshooting '7.2 Messages of Trap that the Maintenance Personnel should Obtain Table 7.2-1 SNMP Trap to be sent by HDI' (TRBL 07-0010).

(2) Based on the management IP address (IP address of the port used in the operation in the single node configuration) of the received failure information, confirm the position of the node where a failure occurred with the system administrator. The confirmed position of the node where a failure occurred is used in the failure analysis for specifying the failure occurrence location and for replacing.
However, if the "KAQK37525-E" SIM message ID is included in the "KAQG46040-E" that is received Trap ID of SNMP Trap, there is a possibility that the system data or the user data has been lost. In this case, it is needed to execute the initial installation of OS and to restore the data from the backup information. For this reason, execute the Table C.1.2-1 or Table C.1.2-2 according to the configuration.

(3) Based on the collected failure information, perform the failure analysis and failure determination operation. For the details of the failure analysis and failure determination operation, refer to 'C.2.2 Determination Procedure when a Failure Occurred'.

Table C.1.2-1 Procedures for restoring data in the node in the configuration using management port

#	Contents	Worker
1	Execute the initial OS installation (with RAID reconfiguration) (*1)	Maintenance personnel
2	Execute setup after installation is completed.	Maintenance personnel
3	Execute the restoration of the system LU (including user data)	System administrator
4	Confirm that no error message related to the file system or the file sharing is output	System administrator
5	In the HDI for Cloud configuration, confirm if the file configuration is consistent between the HDI and the HCP after performing the restoration by using the CLI command which is open to the system administrator.	System administrator
6	Execute the I/O confirmation for the system	System administrator

*1: All data within the node will be initialized.

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Table C.1.2-2 Procedures for restoring data in the node in the configuration using trunk 2 Data ports

#	Contents	Worker
1	Ask the system administrator to search a vacant port of IP-SW of front-end LAN, then connect the Management port of the node to the vacant port with a LAN cable.	Maintenance personnel
2	Execute the initial OS installation (with RAID reconfiguration) (*1)	Maintenance personnel
3	Execute setup after installation is complete (Set the IP address and Routing used for trunk 2 data ports in the front-end LAN to the Management port IP address. (Ask the system administrator about the IP address and Routing for trunk 2 data ports in the front-end LAN.)	Maintenance personnel
4	Execute the restoration of the system LU (including user data)	System administrator
5	After the restoration is completed, remove the LAN cable between IP-SW of front-end LAN and the Management port that was connected at sequence #1 of the node .	Maintenance personnel
6	Confirm that no error message related to the file system or the file sharing is output	System administrator
7	In the HDI for Cloud configuration, confirm if the file configuration is consistent between the HDI and the HCP after performing the restoration by using the CLI command which is open to the system administrator.	System administrator
8	Execute the I/O confirmation for the system	System administrator

*1: All data within the node will be initialized.

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C.1.3 When the System Administrator Noticed a Failure

When the system administrator detected a failure, it is reported to the Maintenance Center of (HDS) by the system administrator. The maintenance personnel should perform the local initial measurement and failure analysis according to the following.
Refer to C.1.3.1 Action to be taken in the cluster configuration for the cluster configuration.

C.1.3.1 Action to be taken in the cluster configuration

(1) When the failure noticed by the system administrator is LED alarm lighting of the parts (power unit, internal drive and others)

NOTE: Even if the fault LED is lit, ignore it.

① Request the system administrator to check the status of the LED alarm lighting of the installed parts.

② The confirmed information is used in the failure analysis.

③ Based on the collected failure information, perform the failure analysis and failure determination operation. For the details of the failure analysis and failure determination operation, refer to 'C.2.2 Determination Procedure when a Failure Occurred'.

(2) When the failure noticed by the system administrator is the abnormal OS operation and inaccessible
Request the system administrator if he/she can access the both node with HFSM, and if it can be accessed, check whether failover has occurred or not.

- Proceed to (2-1) if the system administrator cannot access the both nodes with HFSM and installing the management LAN IP-SW provided by (HDS).
- If the management LAN IP-SW owned by the customer is installed, request the customer to determine the failure.
- When the failover has occurred, proceed to step (2-2).
- When the failover has not occurred, proceed to step (2-3).

(2-1) When it cannot access the both nodes with HFSM

① Remove the LAN cable connected to the #7 port on the management LAN IP-SW, and connect the removed LAN cable to the #9 port on the management LAN IP-SW. Request the system administrator to check whether it can communicate with the both nodes with HFSM.
When it is available to communicate, execute the step ② to ⑤. When it is not available to communicate, reconnect the removed LAN cable to the port as it was connected, and execute the step ⑥.

② Because of the port failure of the maintenance LAN IP-SW, ask the system administrator to perform the failover the resource group.
If the system administrator is not available to operate, maintenance personnel should perform this operation with the permission of the system administrator.
For to which node should be moved, follow the instruction by the system administrator. If no instruction is given by the system administrator, perform failover the resource group from the node1 to the node 0.
For the details of performing procedure, refer to "Maintenance Tool '3.1 Failover Node Termination to Execute the OS stop or OS reboot' (MNTT 03-0000)".

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③ Remove the #3 port on the maintenance LAN IP-SW that is connected with the management port on the side of node1, and remove the LAN cable that is connected with the management port on the side of node0.

④ Connect the LAN cable that is removed from #3 on the maintenance LAN IP-SW at the step ③ to the management port on the side of node0.

⑤ Replace the management LAN IP-SW. For the replacement of management LAN IP-SW, refer to "Replacement '1.6 Replacing the Management LAN IP-SW (IP Switch) (1) Replacement procedure while the node is in operation' (REP 01-0290)".
After replacing the management LAN IP-SW, execute the operation described in "Troubleshooting '9.1.2 Confirmation of Recovery from Hardware Failure' (TRBL 09-0010)".

⑥ Request the system administrator to replace the LAN cable that is connected between the HFSM and the management LAN IP-SW, and check if the connection can communicate or not.
If it cannot communicate, it is a failure of the management server. Therefore, request the system administrator to review and replace the management server.

(2-2) When failover has occurred

① Request the system administrator to check SIM. The confirmed SIM is used in the failure analysis.

② Based on the collected failure information, perform the failure analysis and failure determination operation. For the details of the failure analysis and failure determination operation, refer to 'C.2.2 Determination Procedure when a Failure Occurred'.

(2-3) When failover has not occurred

① The system administrator may have performed the incorrect setting. Request the system administrator to recheck the items before and after the setting if there are any errors or not.

② Request the system administrator to acquire the failure information.

③ Execute the manual dump operation. Furthermore, inform the Technical Support Center of the manual dump execution.

④ Send the acquired failure information to the Technical Support Center via e-mail.

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C.1.3.2 Action to be taken it the single node configuration

(1) In the single node configuration, maintenance personnel get the result of failure determination operation from the system administrator, and execute the action to be taken according to the result. Figure C.1.3.2-1 shows the overview of the determination flow to be executed by the system administrator.

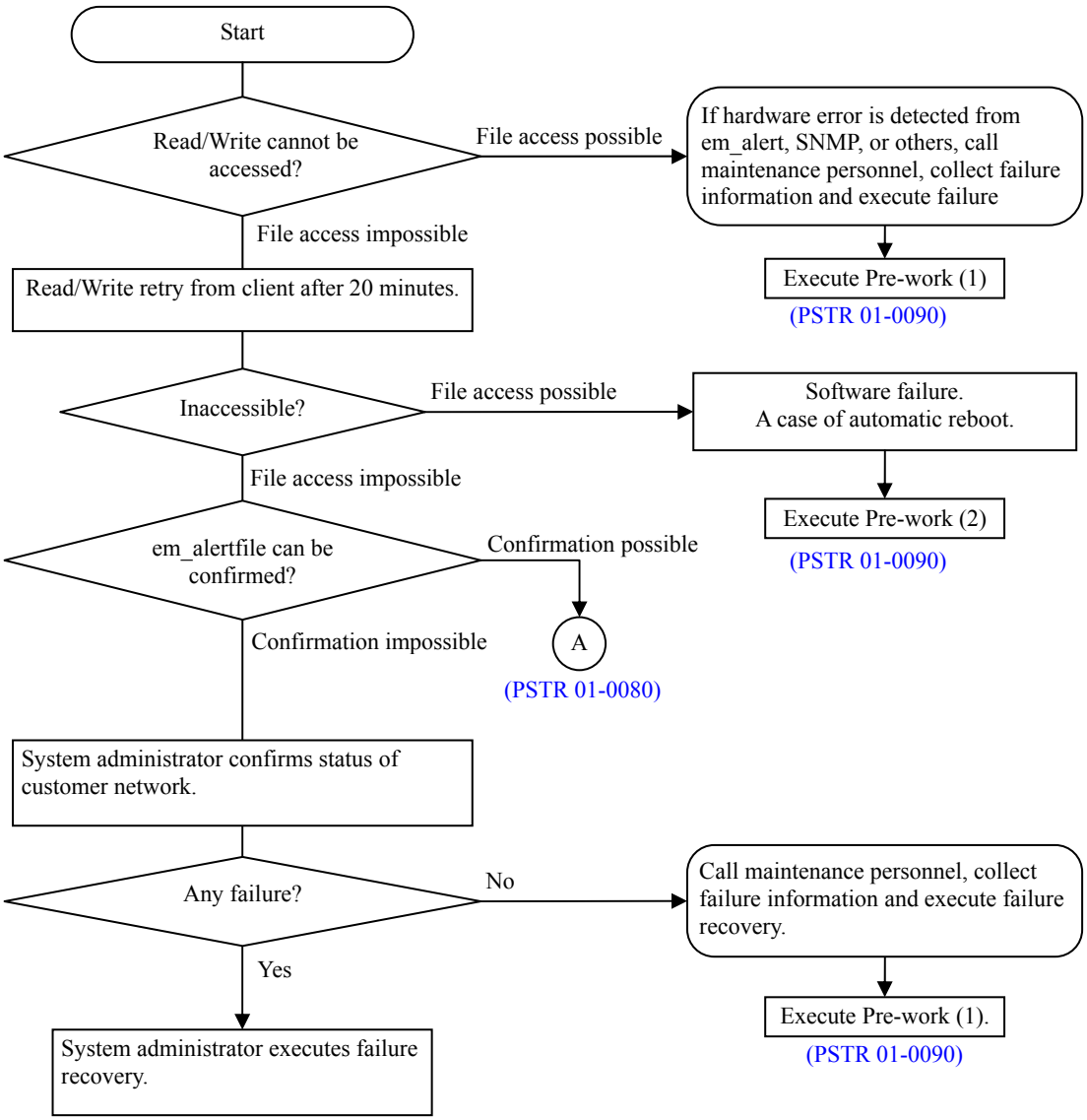

Figure C.1.3.2-1 Overview of Determination Flow by System Administrator (1/2)

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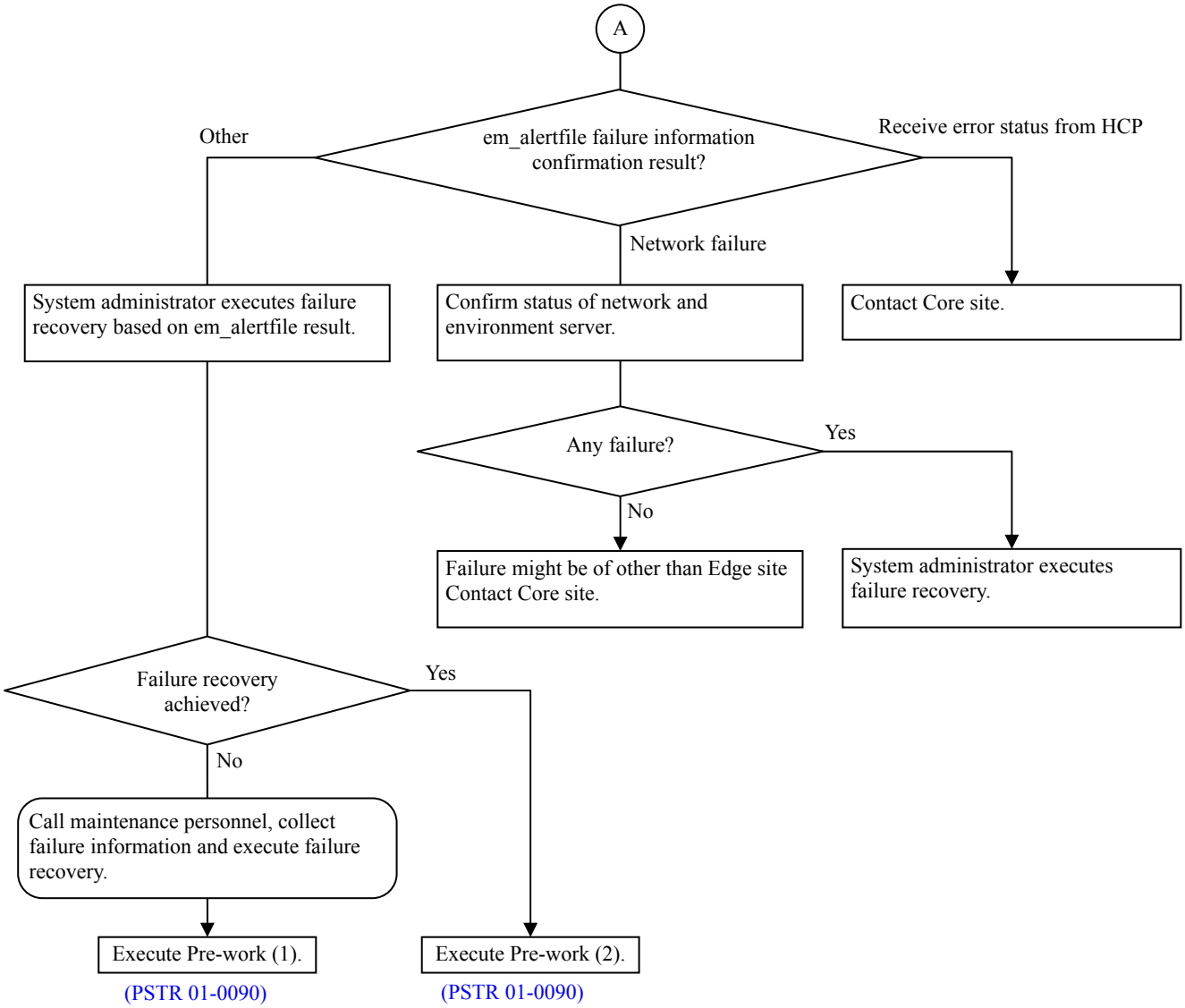

Figure C.1.3.2-1 Overview of Determination Flow by System Administrator (2/2)

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<Pre-works in the single node configuration>

Pre-work (1) When the system administrator cannot restore from the failure information (such as em_alert/SNMP Trap).
Execute failure analysis and the failure determination based on the collected failure information.
Refer to 'C.2.2 Determination Procedure when a Failure Occurred' for the details of failure analysis and determination process of a failure.

Pre-work (2) OS is running, and when the system administrator can be restored from the failure information (such as em_alert/SNMP Trap).
Because the restarting operation is available, collect the failure information from the system administrator.

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C.1.4 When the Maintenance Personnel Noticed the Failure at the Time of Initial Installation in the Local Site

When the maintenance personnel noticed that LED that indicates the parts failure on the node is lit at the time of initial installation on the spot, perform the initial response on the spot and failure analysis.

NOTE: The fault LED might be lit not only when the hardware failure occurs, but also the manual dump collection is performed. The fault LED is still lit even after completing the all health checks. However it does not have a problem.

(1) Check the alarm lighting of the installed parts and others of the node in which the failure occurred.

(2) Perform “hwstatus” for the node in which the failure occurred.
For the details of “hwstatus”, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus)’.

(3) Acquire the result of “hwstatus”. Note that the connection (remote node BMC connection status) of BMC Information becomes “none” (cluster not built) at the time of initial installation because it is before the cluster building.

(4) Based on the result of “hwstatus”, replace the failure occurrence parts of the failure occurrence node.
For the details of the part replacement, refer to “Replacement ‘Chapter 1 Replacing the Components of Hitachi Data Ingestor’ (REP 01-0000)”.

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C.1.5 Determination Procedure for the Possible Failure Part when a PCI Error Occurred

D51B-2U does not support PCI Error supppot.

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C.2 Failure Determination Procedure

C.2.1 Procedures of Troubleshooting at the Time of Setup

(1) Figure C.2.1-1 shows the flowchart when message IDs described in Table C.2.1-1 are output due to the failure of new installation or the failure of update installation.

Table C.2.1-1 List of Message IDs (1)

Message ID	KAQG61007-E KAQG61008-E KAQG61010-E KAQG61025-E KAQG61027-E

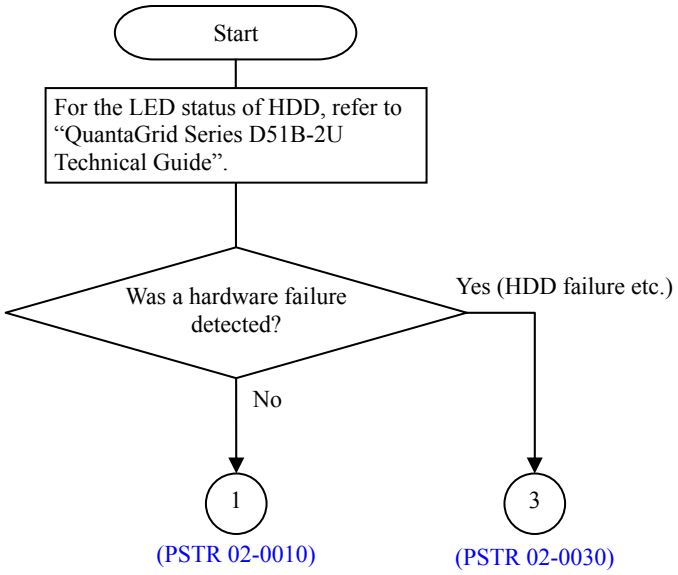

Figure C.2.1-1 Flow of Diagnosis for the Media Failure (1/4)

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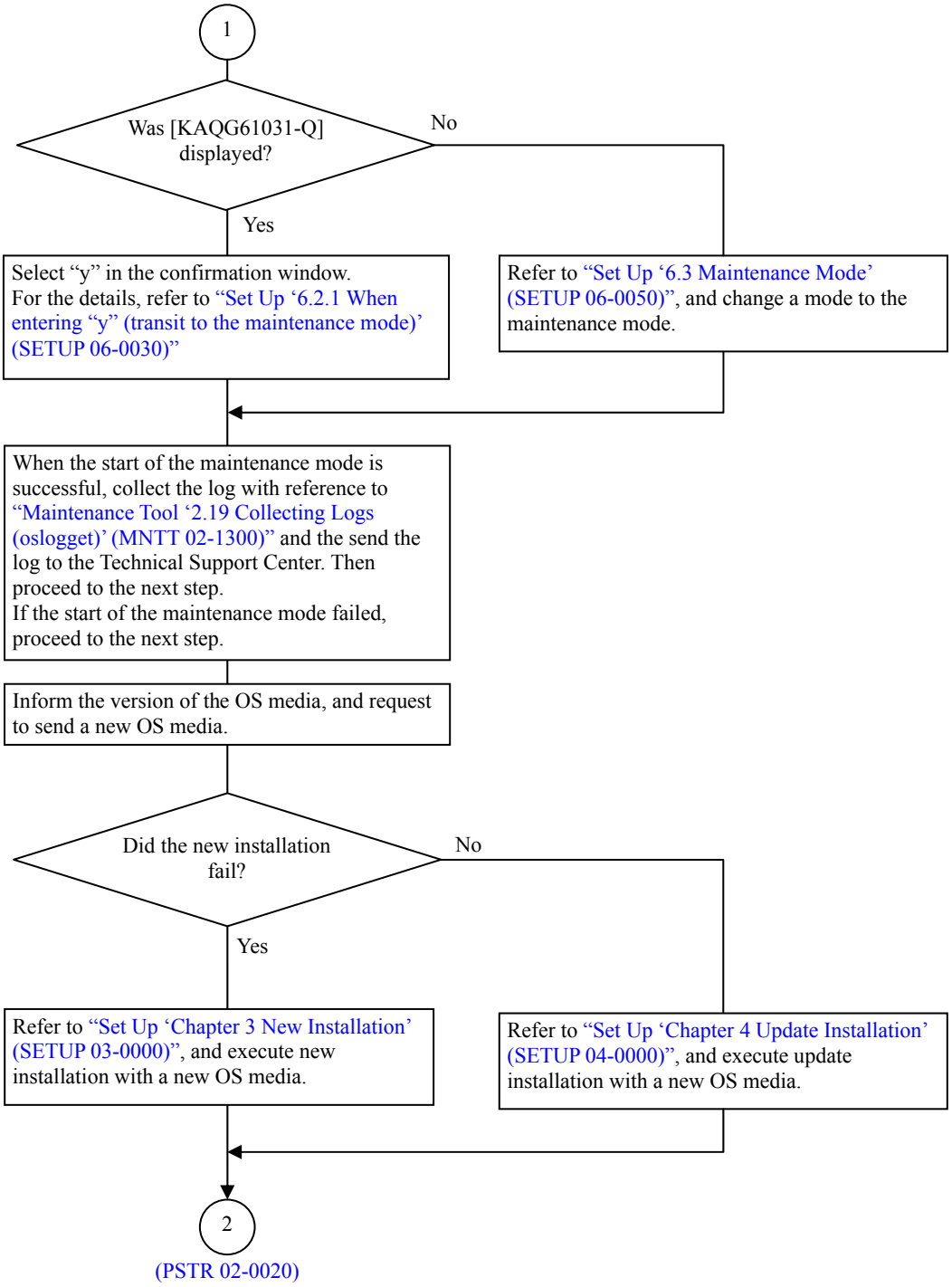

Figure C.2.1-1 Flow of Diagnosis for Media Failure (2/4)

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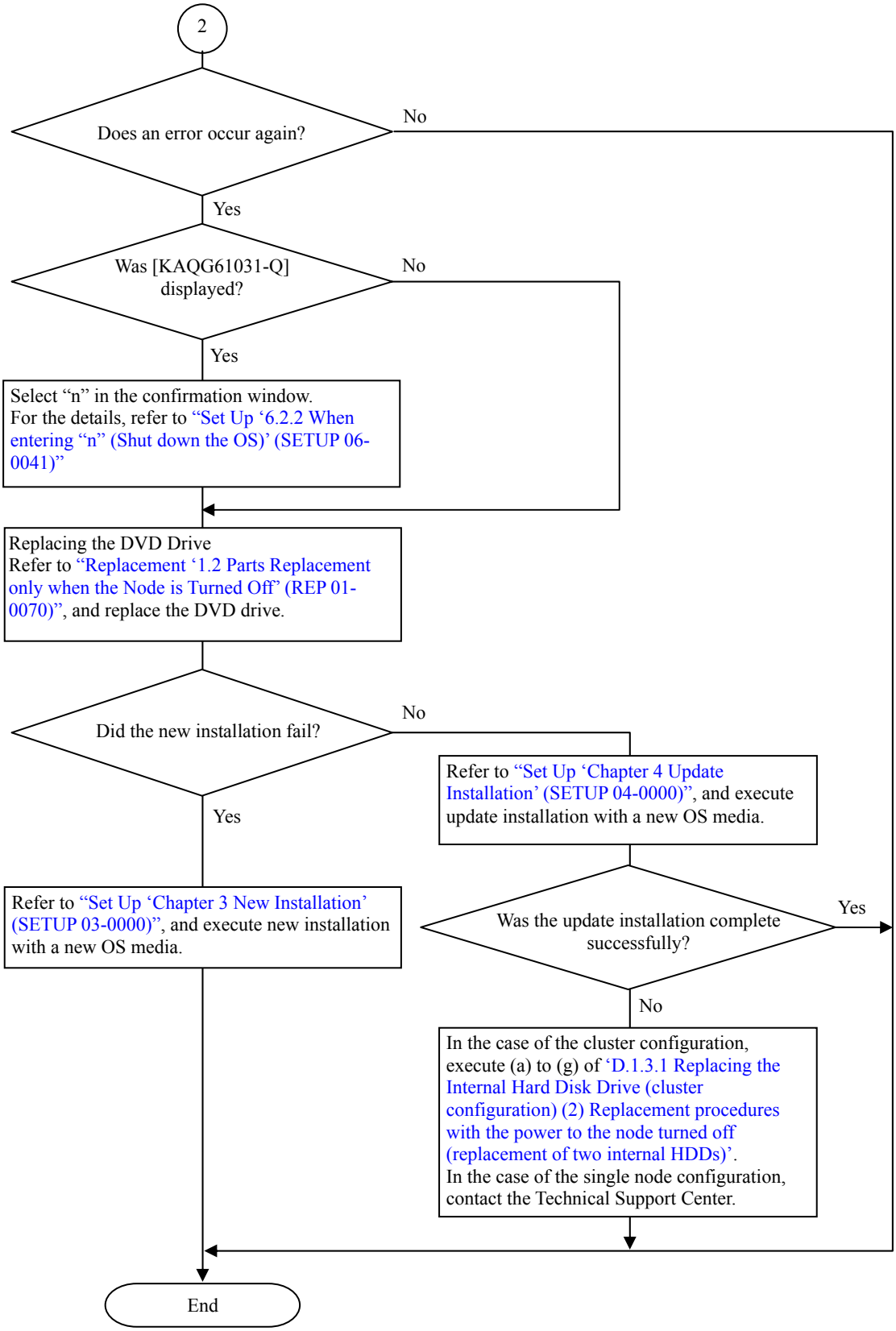

Figure C.2.1-1 Flow of Diagnosis for Media Failure (3/4)

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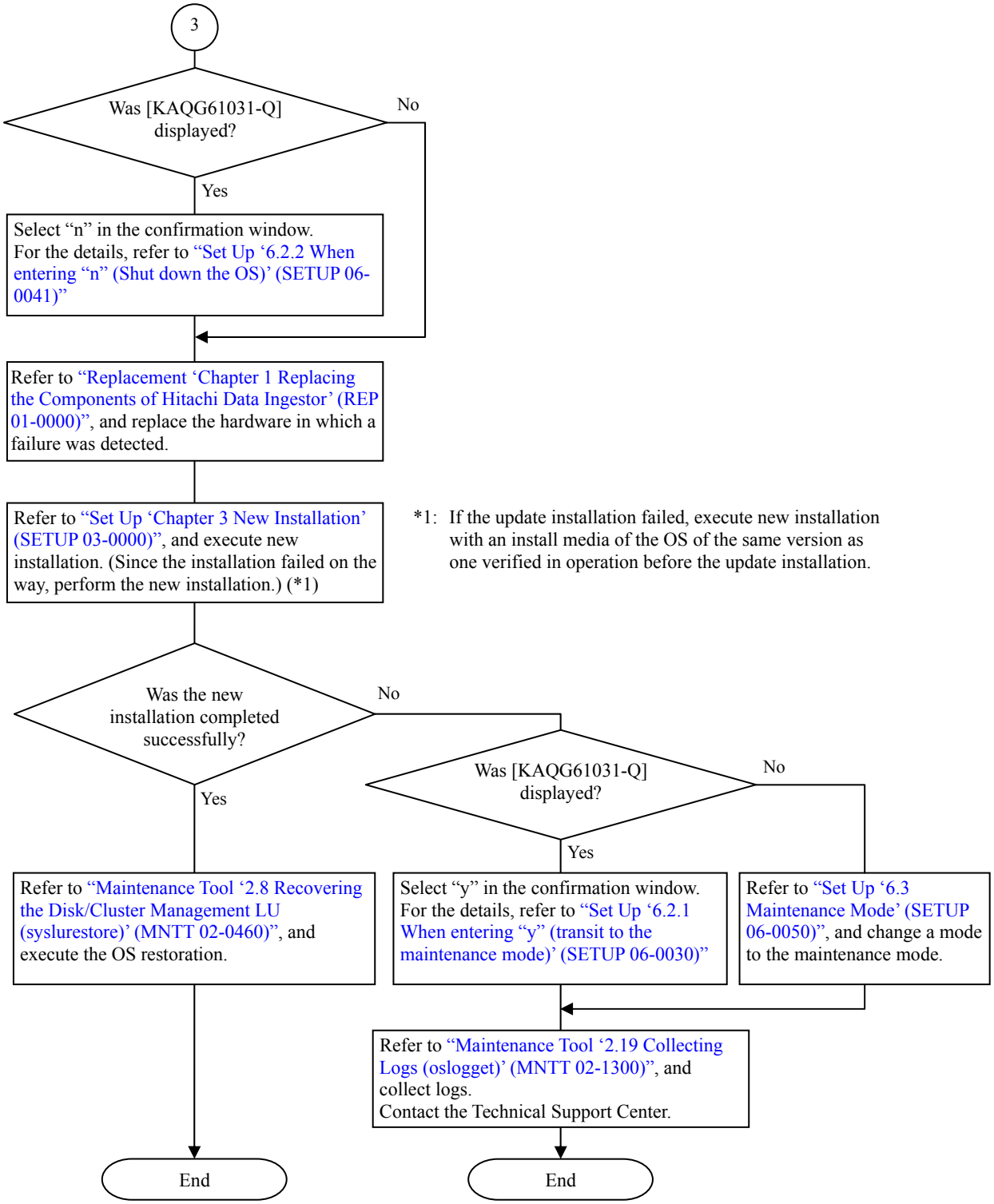

Figure C.2.1-1 Flow of Diagnosis for Media Failure (4/4)

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(2) Figure C.2.1-2 shows the flowchart when message IDs described in Table C.2.1-2 are output due to the failure of new installation.

Table C.2.1-2 Message IDs List (2)

Message ID	KAQG61020-E KAQG61021-E KAQG61022-E KAQG61009-E KAQG61011-E KAQG61012-E KAQG61013-E KAQG61014-E KAQG61015-E KAQM01024-E KAQM01025-E KAQM01026-E KAQM01028-E KAQM01097-E KAQM14105-E KAQM14134-E KAQM14150-E KAQM14152-E

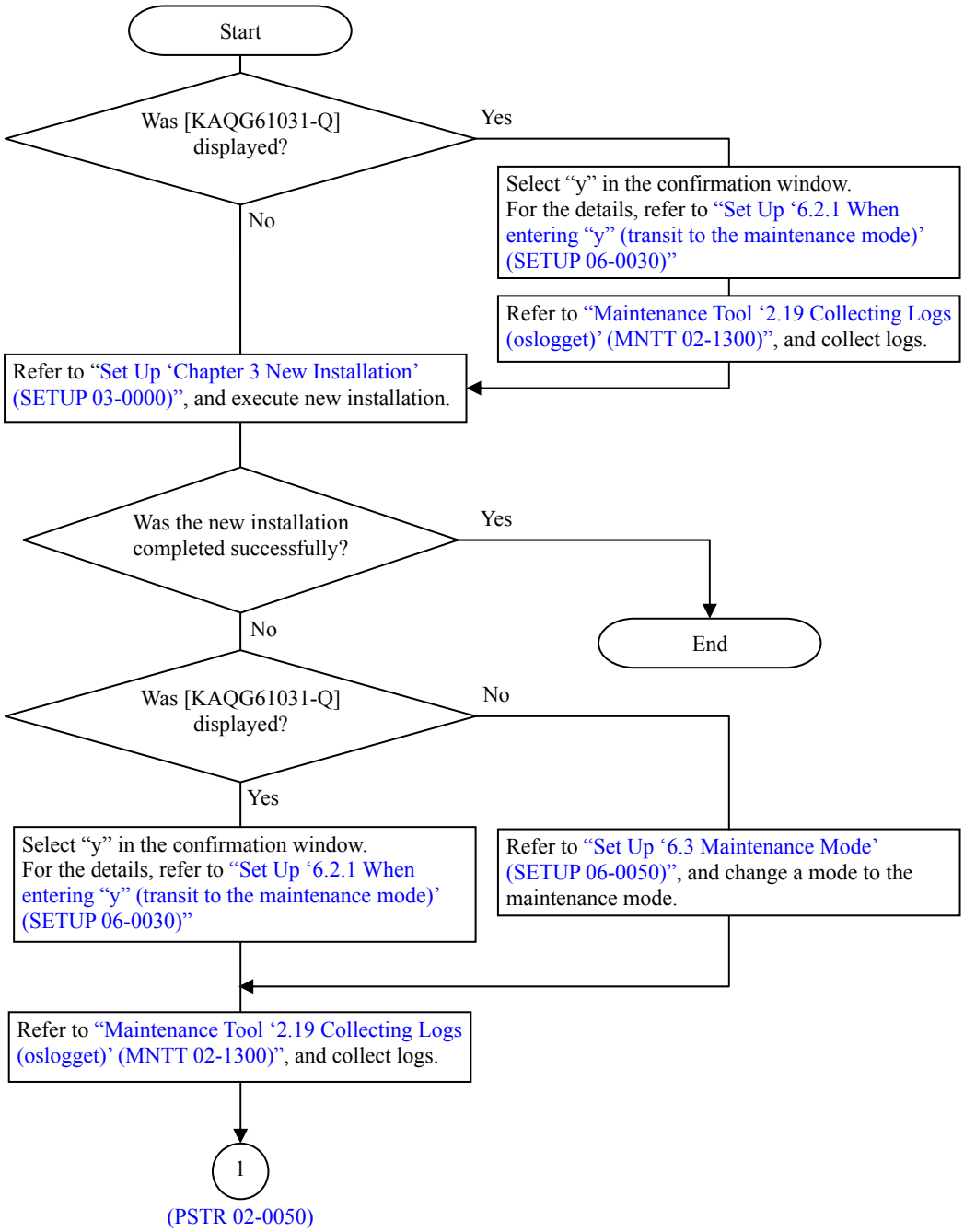

Figure C.2.1-2 Flow of Diagnosis for New Installation Failures (1/2)

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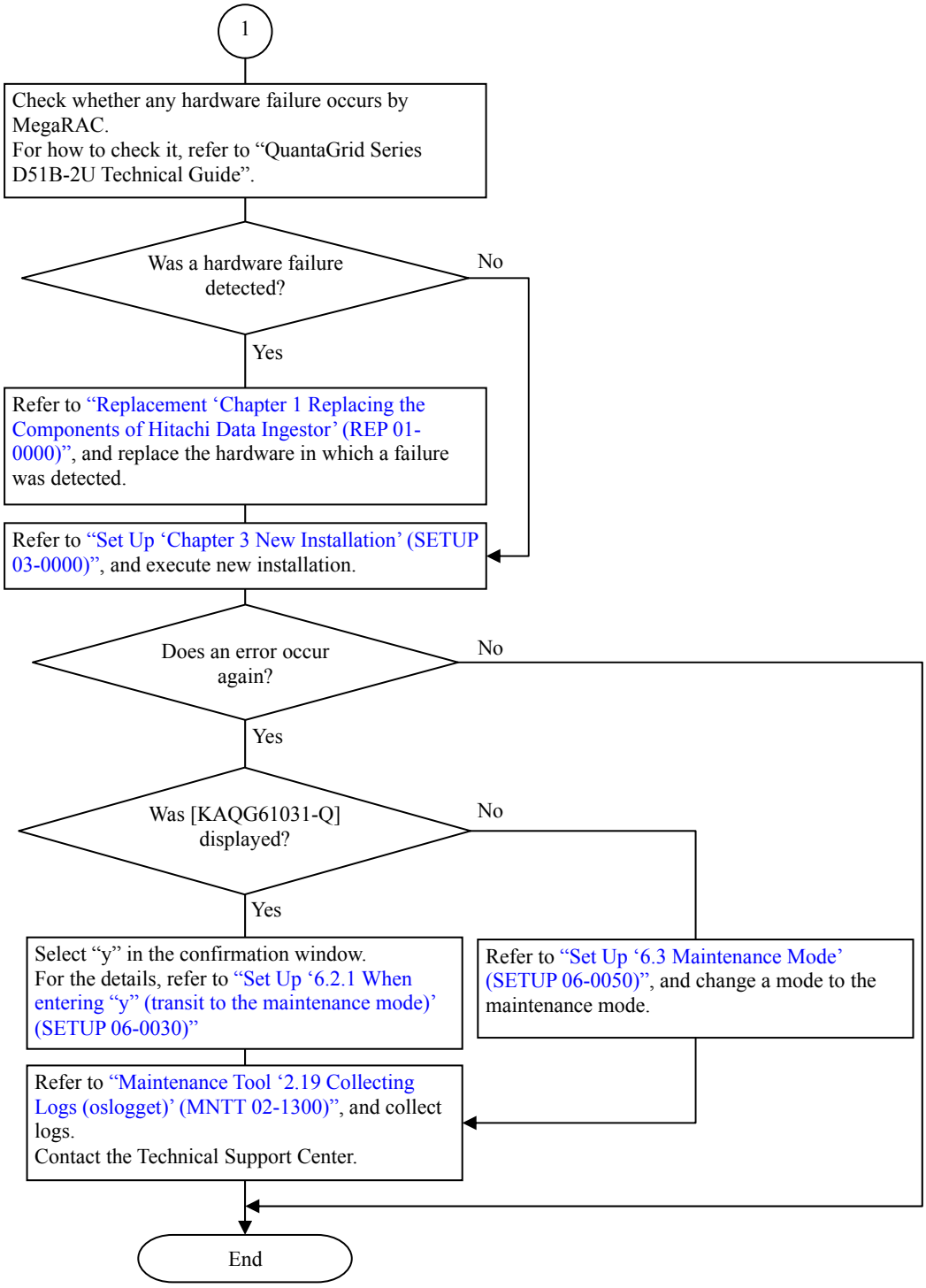

Figure C.2.1-2 Flow of Diagnosis for New Installation Failures (2/2)

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(3) Figure C.2.1-3 shows the flowchart when message IDs described in Table C.2.1-3 are output due to the failure of update installation.

Table C.2.1-3 Message IDs List (3)

Message ID	KAQG61009-E KAQG61020-E KAQG61021-E KAQG61022-E KAQG61011-E KAQG61012-E KAQG61013-E KAQG61014-E KAQG61015-E KAQG61016-E KAQM01024-E KAQM01025-E KAQM01026-E KAQM01028-E KAQM01097-E KAQM14105-E KAQM14134-E KAQM14150-E KAQM14152-E

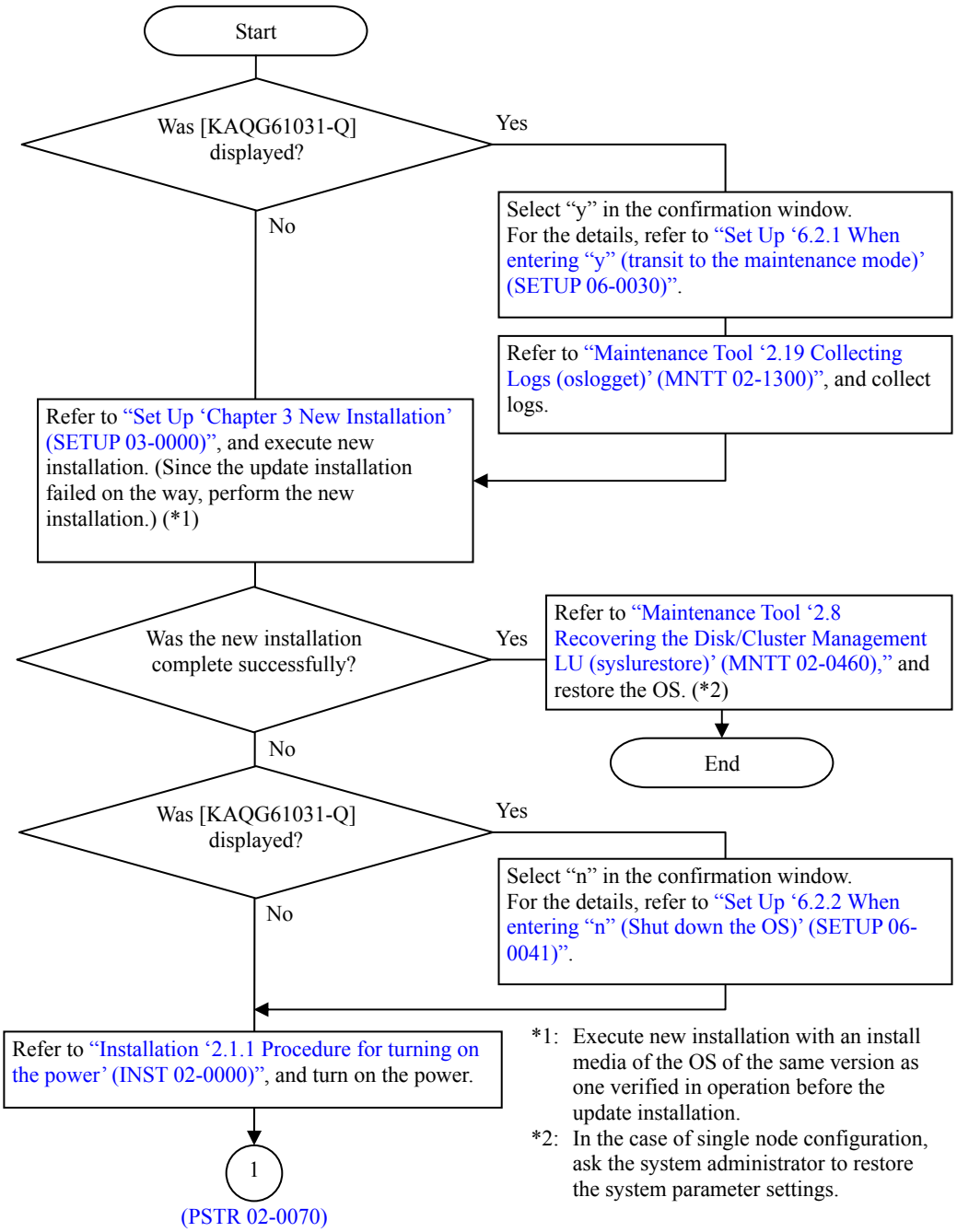

Figure C.2.1-3 Flow of Diagnosis for Update Installation Failures (1/4)

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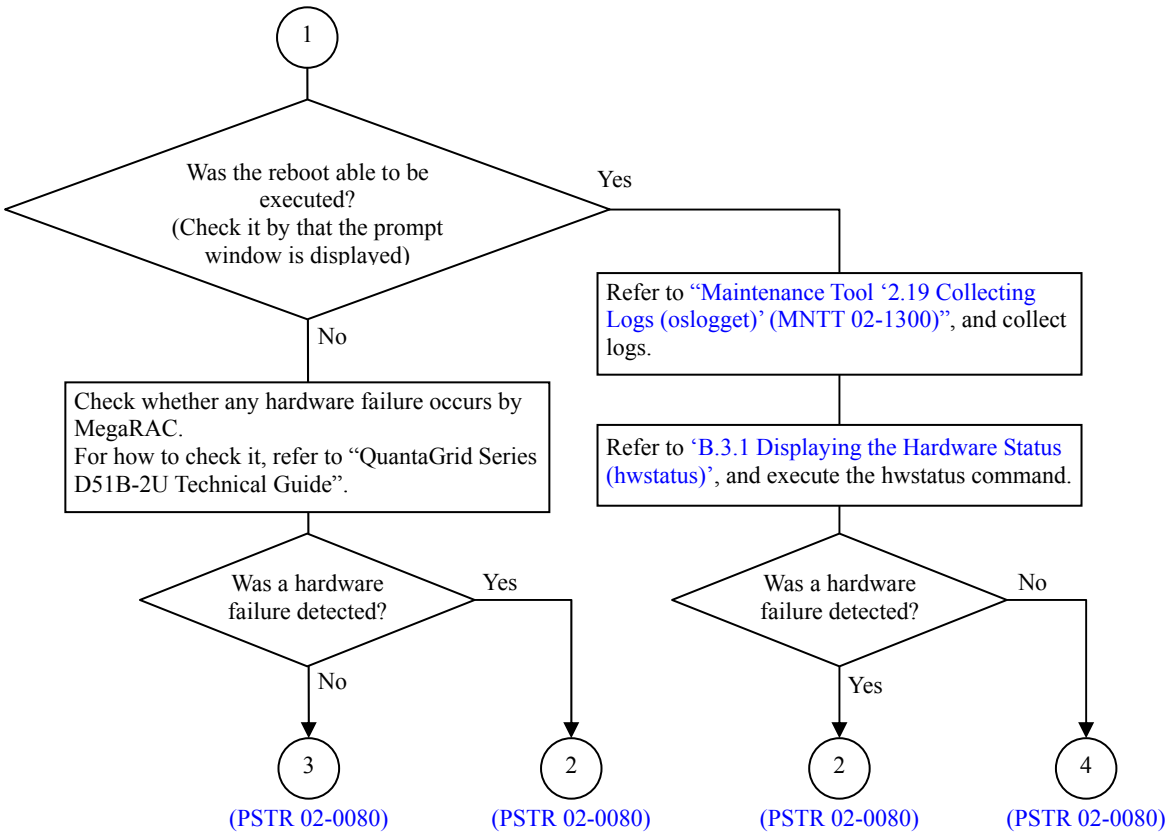

Figure C.2.1-3 Flow of Diagnosis for Update Installation Failures (2/4)

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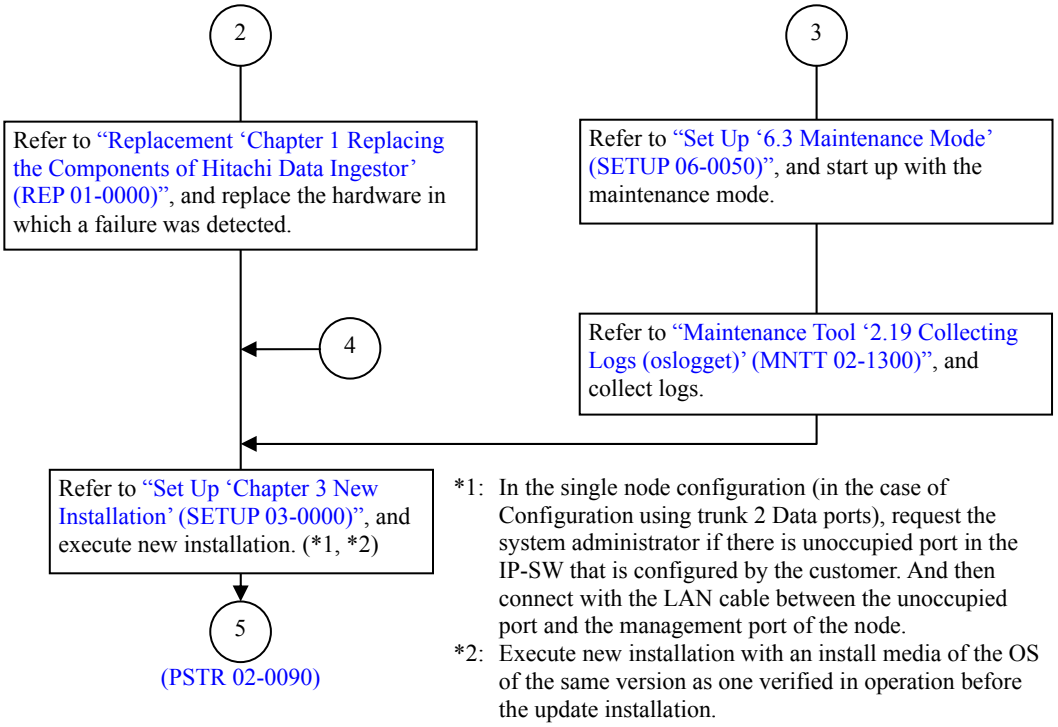

Figure C.2.1-3 Flow of Diagnosis for Update Installation Failures (3/4)

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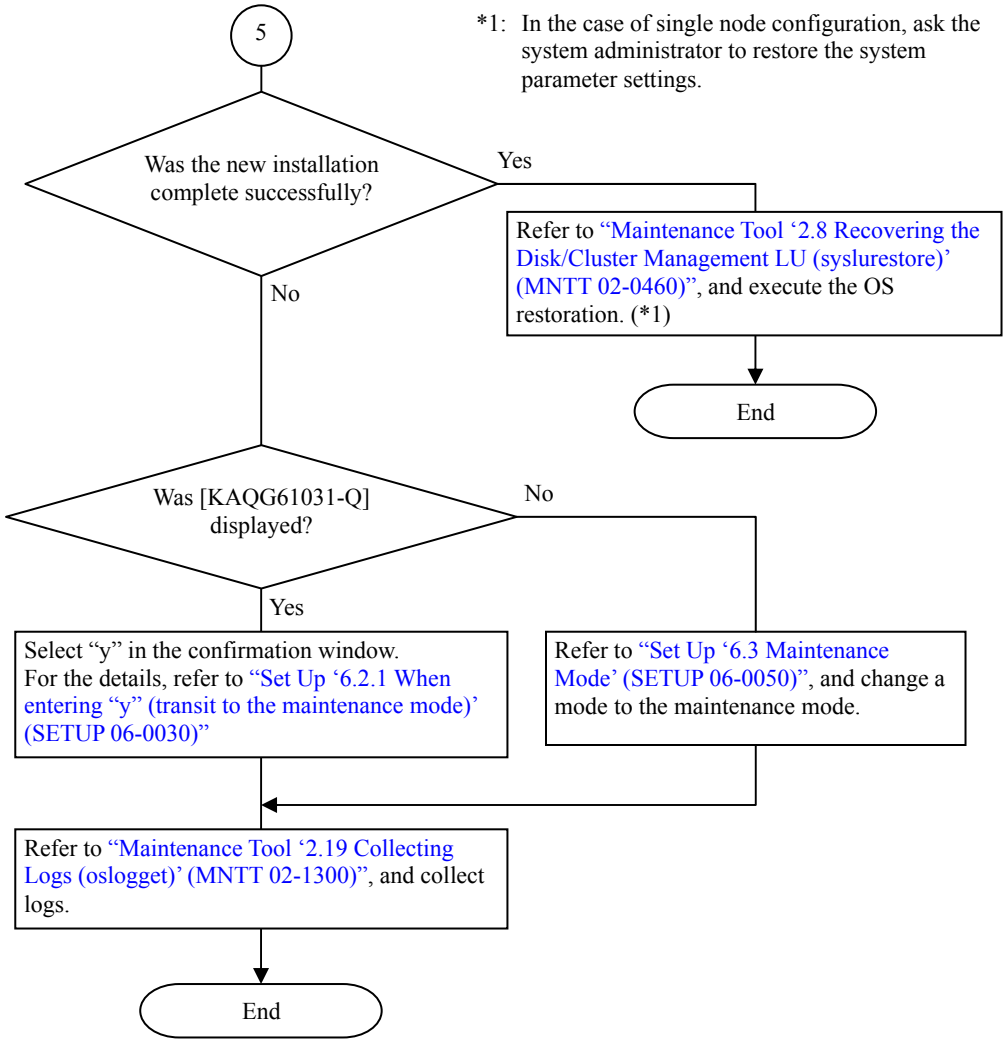

Figure C.2.1-3 Flow of Diagnosis for Update Installation Failures (4/4)

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(4) Figure C.2.1-4 shows the flowchart when message IDs described in Table C.2.1-4 are output due to the failure of update installation.

Table C.2.1-4 Message ID List (4)

Message ID	KAQG61018-W

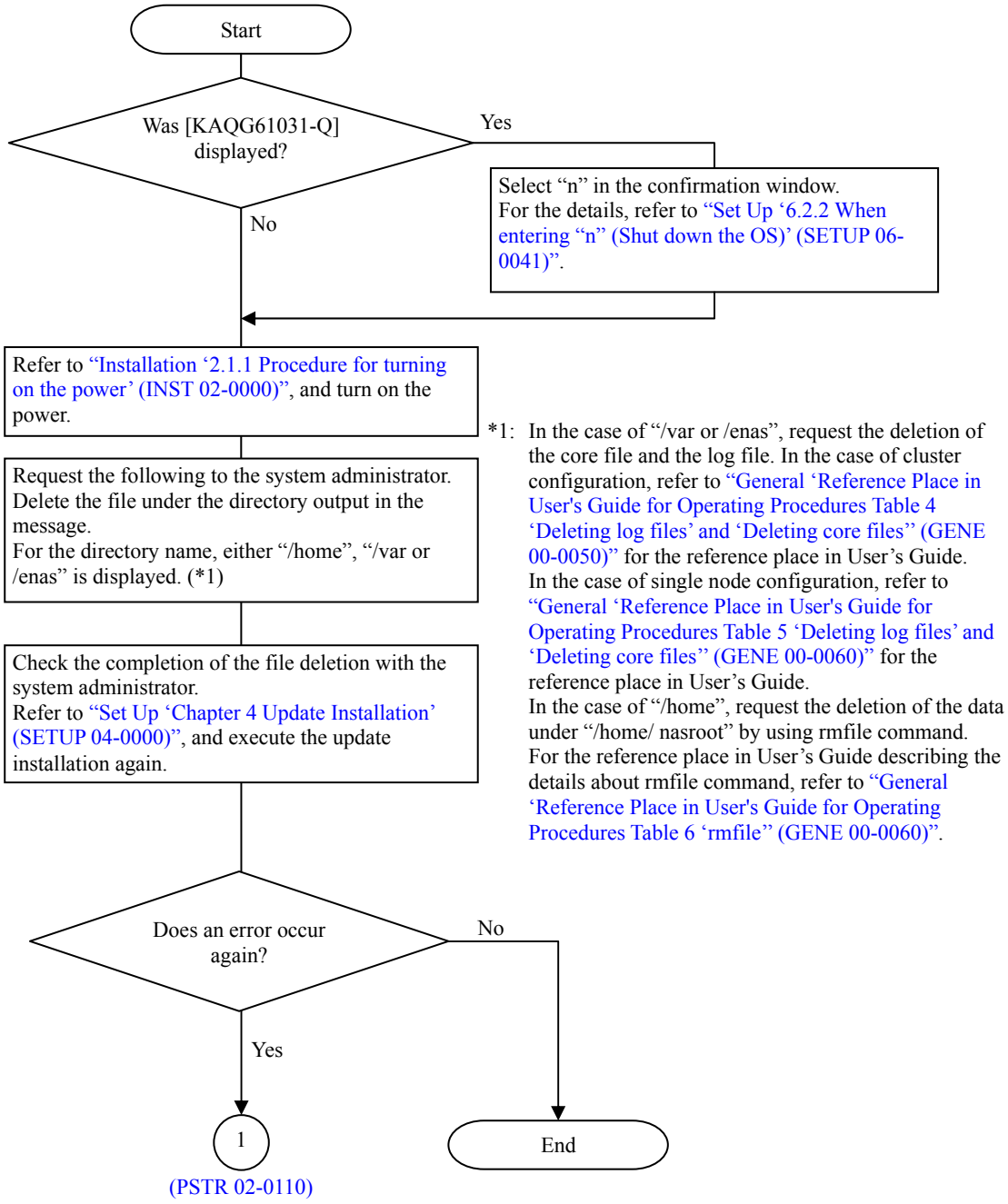

Figure C.2.1-4 Flow of Diagnosis for Lack of Free Space (1/2)

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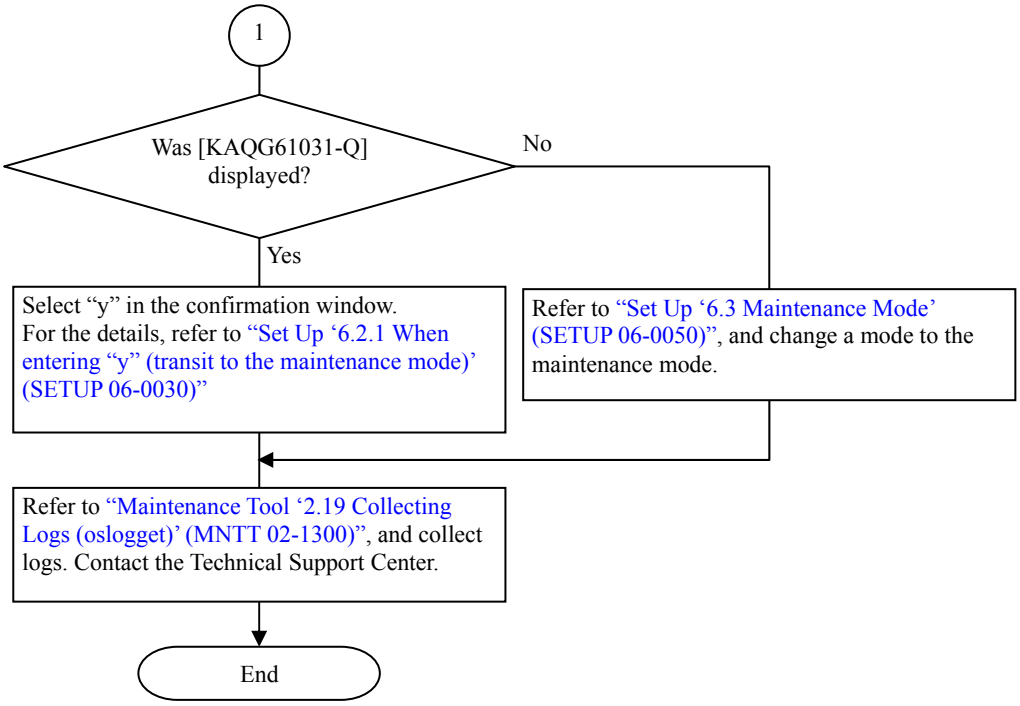

Figure C.2.1-4 Flow of Diagnosis for Lack of Free Space (2/2)

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(5) Figure C.2.1-5 shows the flowchart when message IDs described in Table C.2.1-5 are output by the version check during update installation.

Table C.2.1-5 Message ID List (5)

Message ID	KAQG61024-E

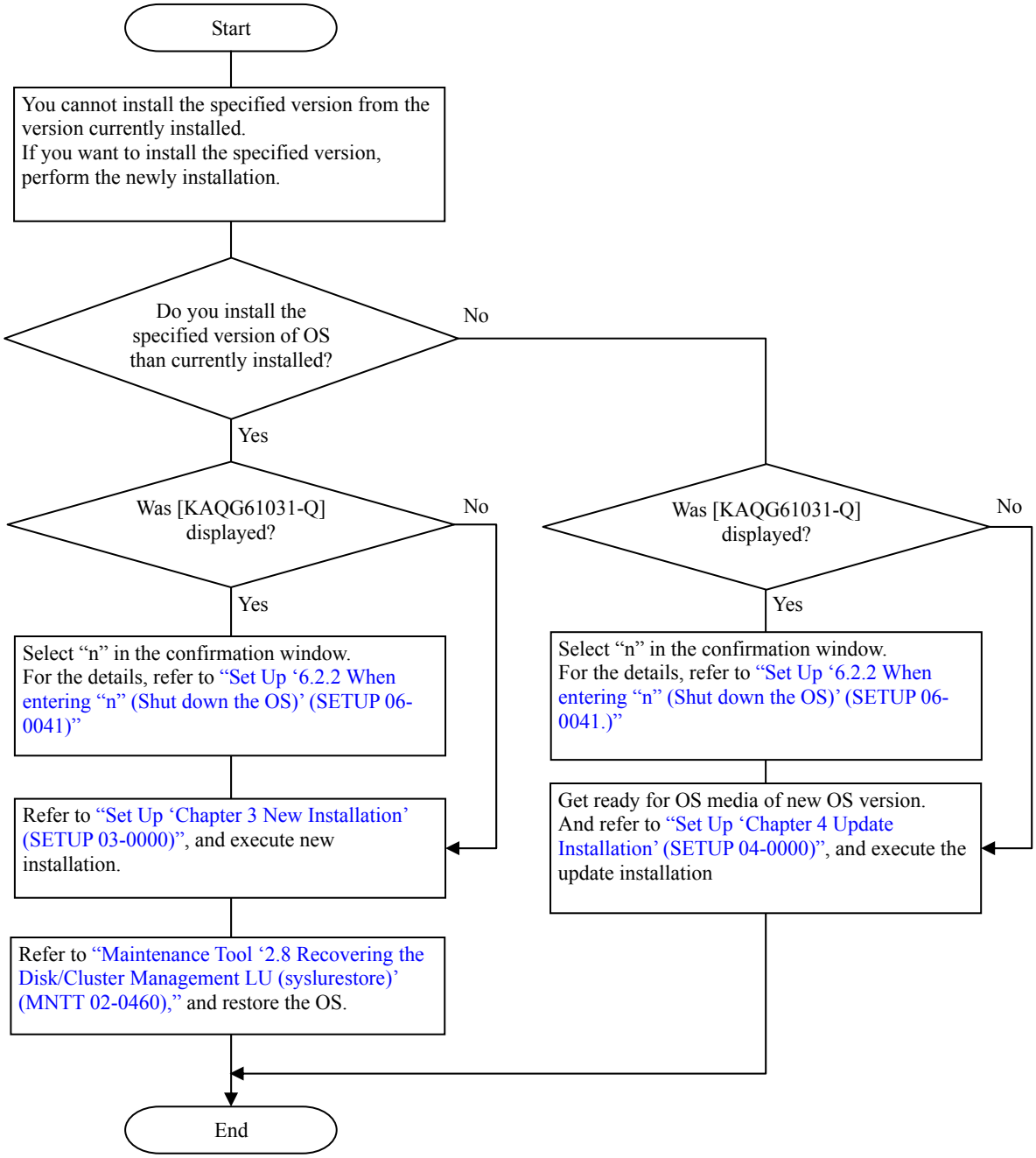

Figure C.2.1-5 Flow of Diagnosis when Checking the Version during Update Installation

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(6) Figure C.2.1-6 shows the flowchart when message IDs described in Table C.2.1-6 are output because the update installation is executed in the state of no OS installed.

Table C.2.1-6 Message ID List (6)

Message ID	KAQG61028-E

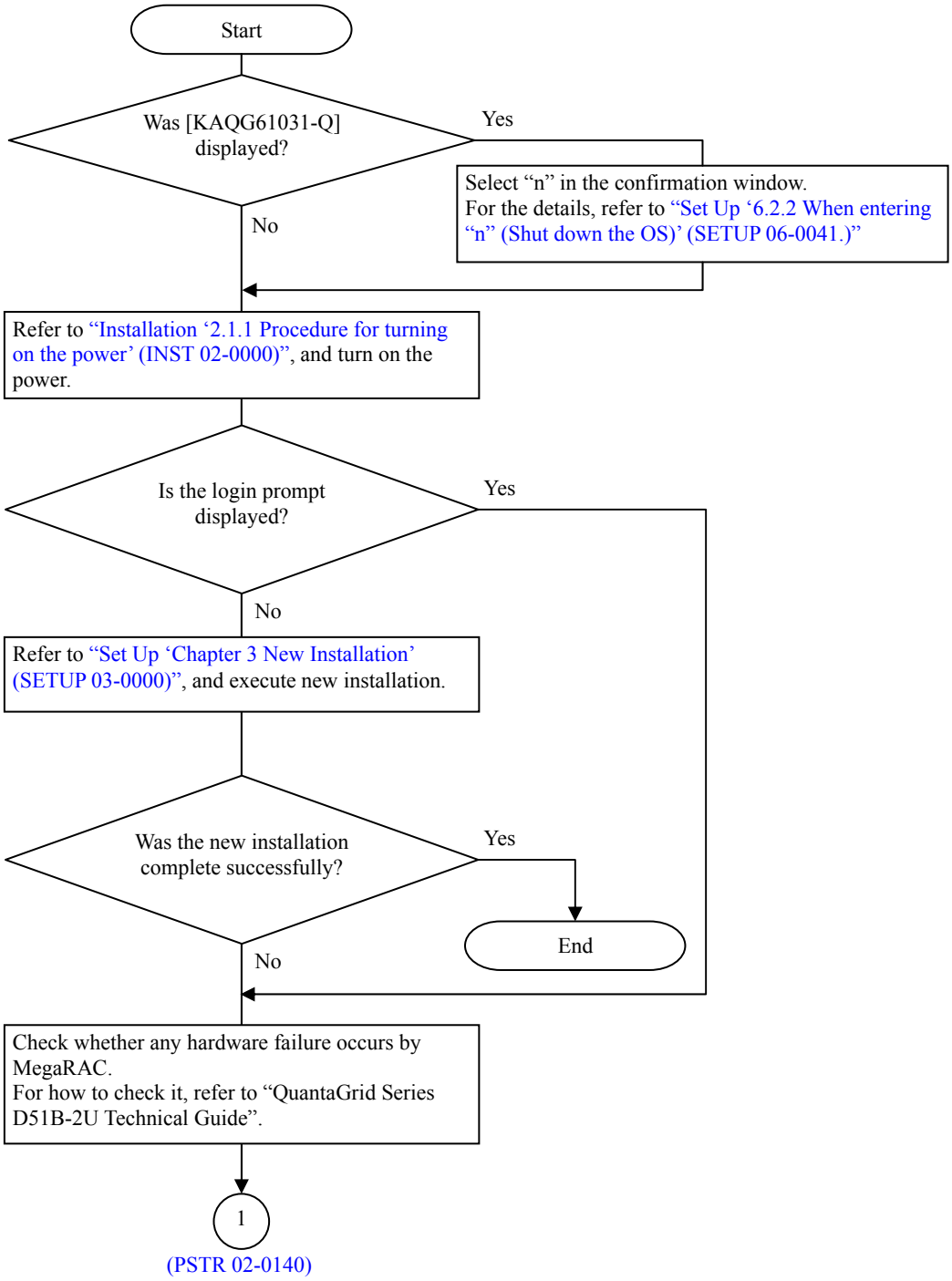

Figure C.2.1-6 Flow of Diagnosis when the Update Installation Failed (1/2)

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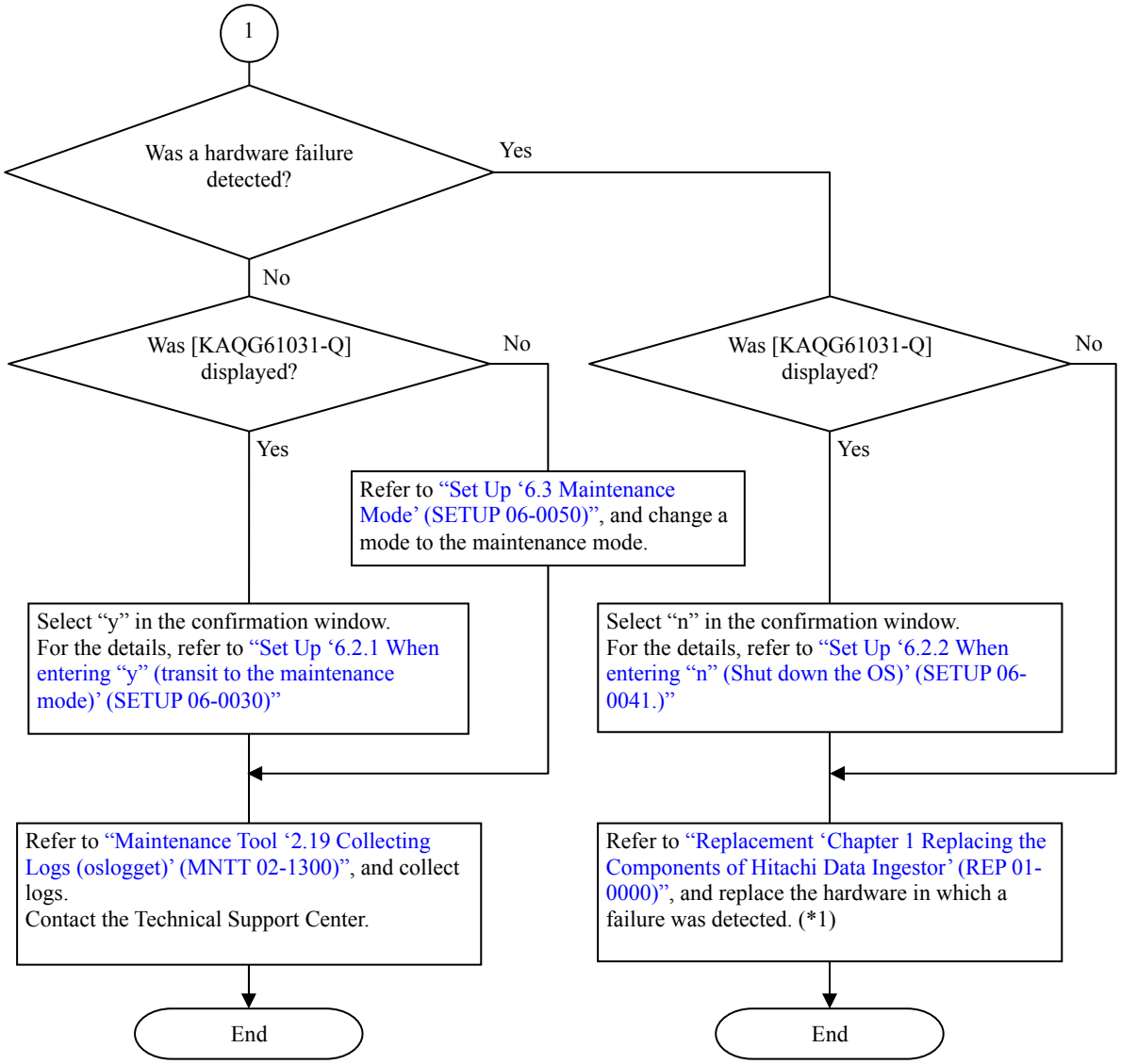

*1: If the new installation is executed along with the parts replacement, use an install media of the OS of the same version as one verified in operation before the update installation to execute the installation.

Figure C.2.1-6 Flow of Diagnosis when the Update Installation Failed (2/2)

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C.2.2 Determination Procedure when a Failure Occurred

C.2.2.1 Failure determination procedure at the cluster configuration

After checking the power supply and the management system network, the failure is determined to either a hardware system failure or a software system failure depending on whether SIM of failover is acquired or not. The entire flow of the failure determination is shown below.

NOTE:
- When not using KVM, use Remote console as an alternative. To use the remote console, connect maintenance PC with BMC port. After checking the operational status and any failure occurrence on the node, remove LAN cable which is connected to BMC port and then connect Remote console to the BMC port. Note that when you remove LAN cable, a BMC failure message (KAQK337508-W) will be output to the destination node of the resource group.
  In addition, do not perform operations such as failover while using Remote console because a reset demand cannot be received.
- If the File Version Restore Function is used, “data of the past version directory” might be inaccessible for a moment after performing failover or failback. Contact the system administrator when failover or failback is to be performed.
- If the logical failure is occured on the file system using the Active File Migration or the Large file transfer, the maintenance personnel might not be able to identify the failure location with the failure determination procedure. Before the completion maintenance procedure, inform system administrator that they can start recovering the work space for AFM.

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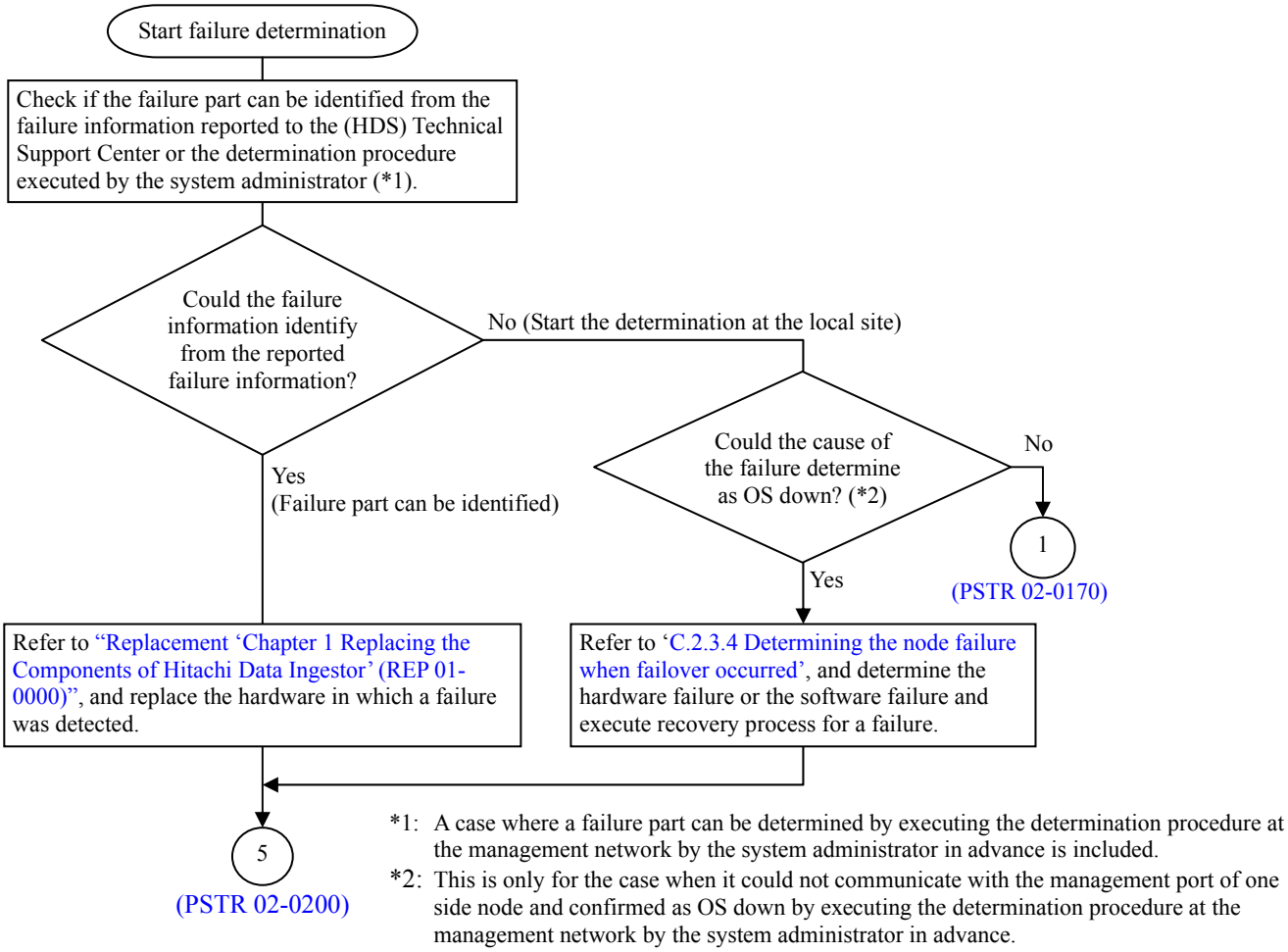

Figure C.2.2.1-1 Procedure for determining failures (1/5)

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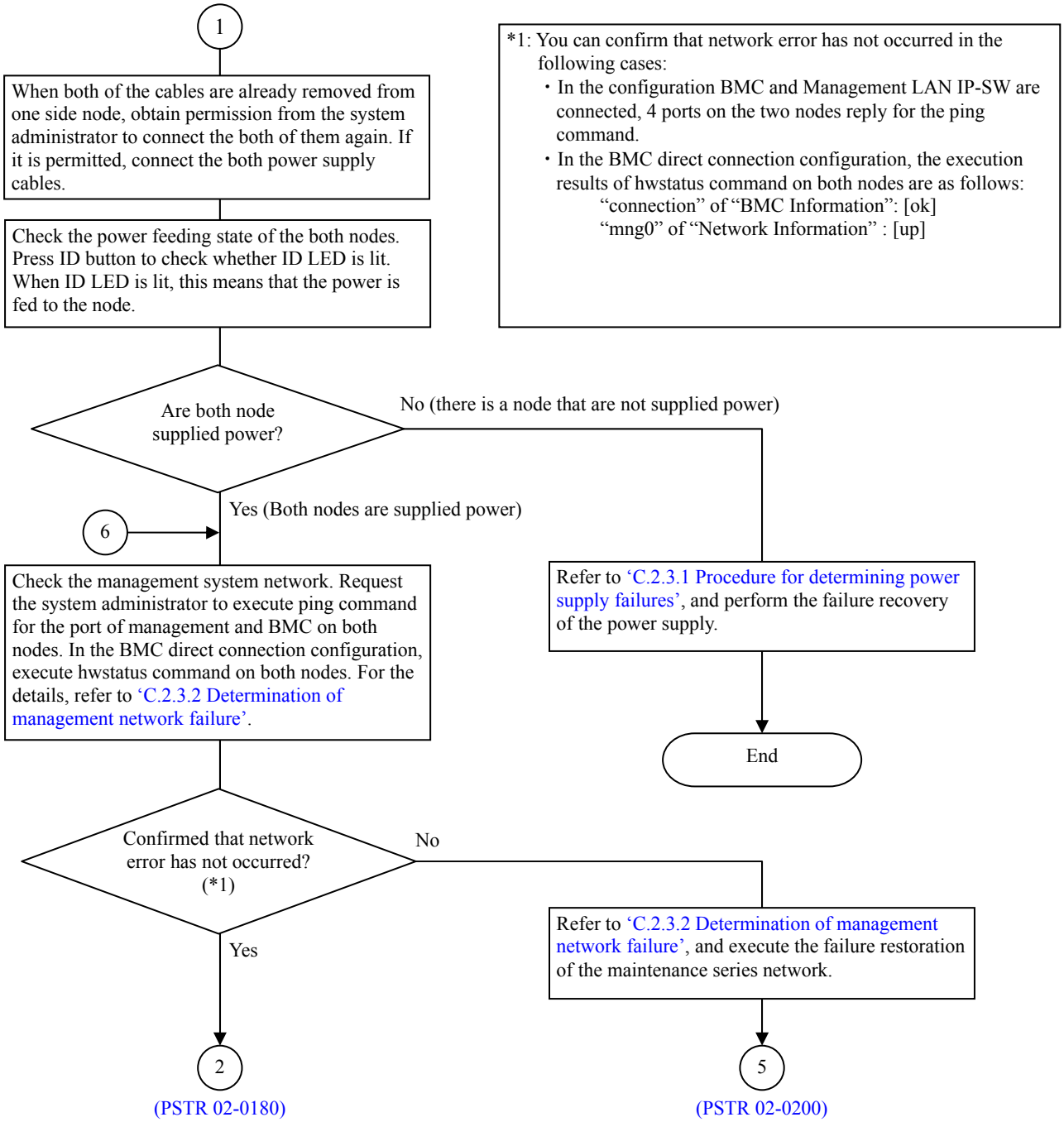

Figure C.2.2.1-1 Procedure for determining failures (2/5)

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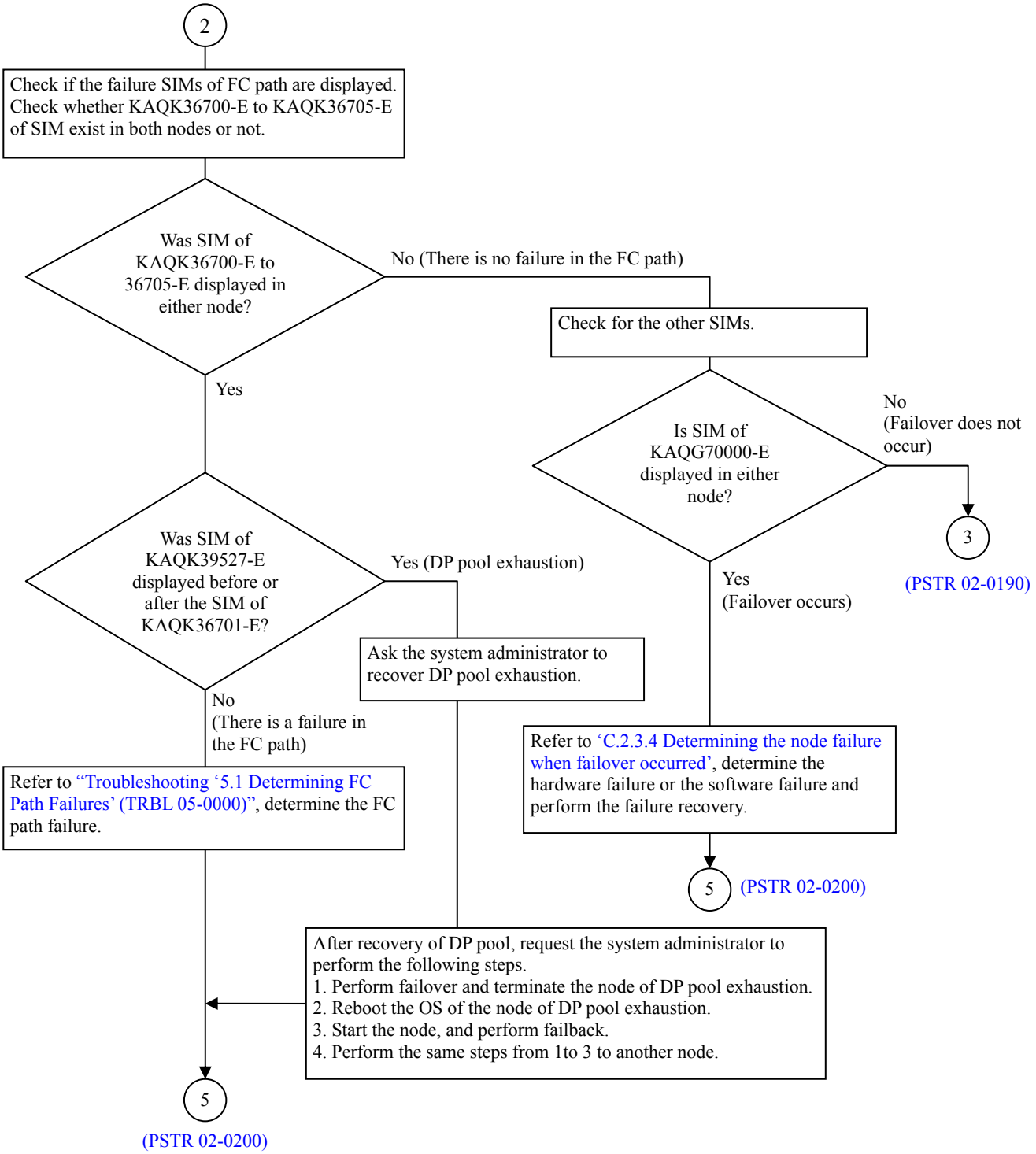

Figure C.2.2.1-1 Procedure for determining failures (3/5)

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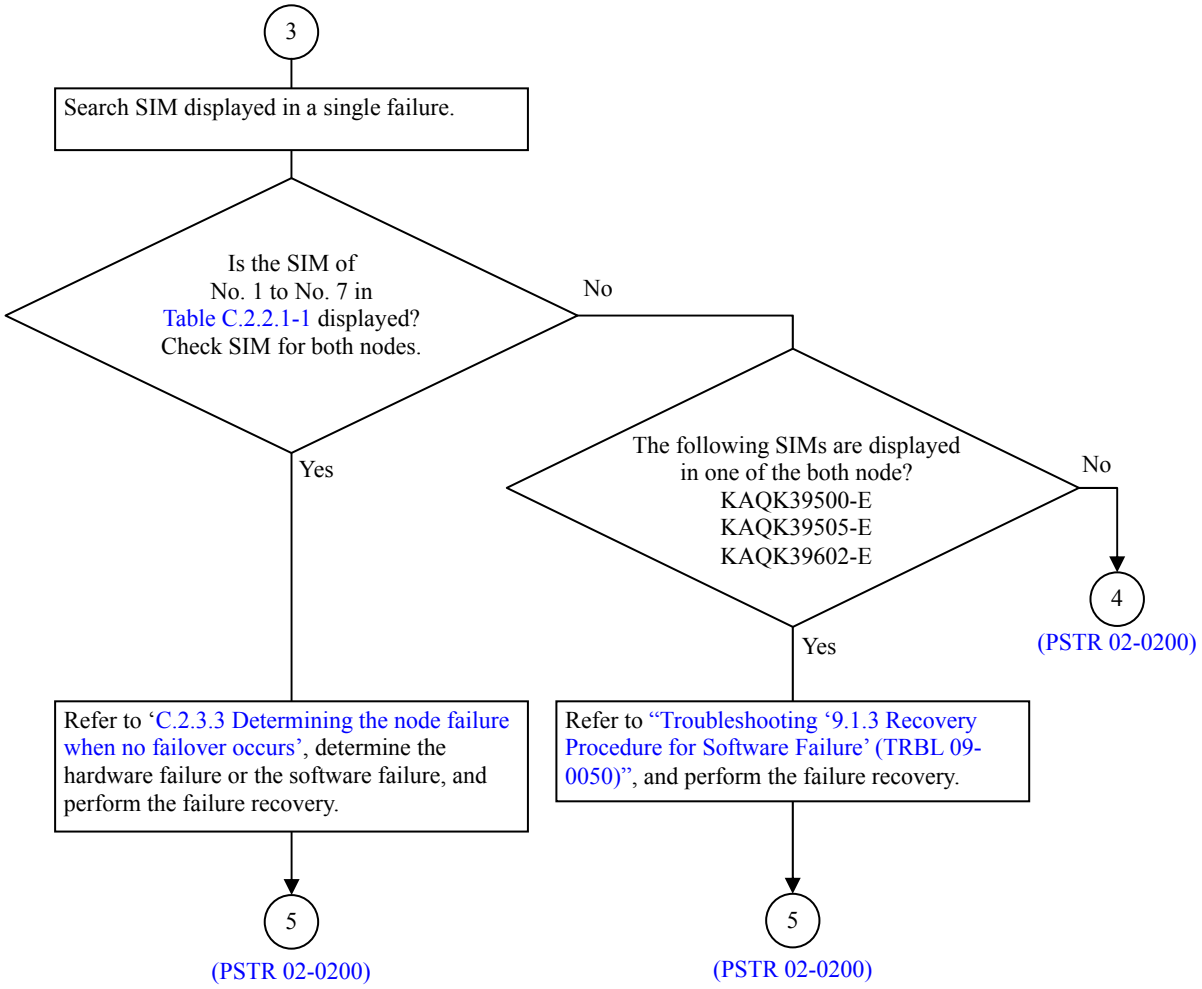

Figure C.2.2.1-1 Procedure for determining failures (4/5)

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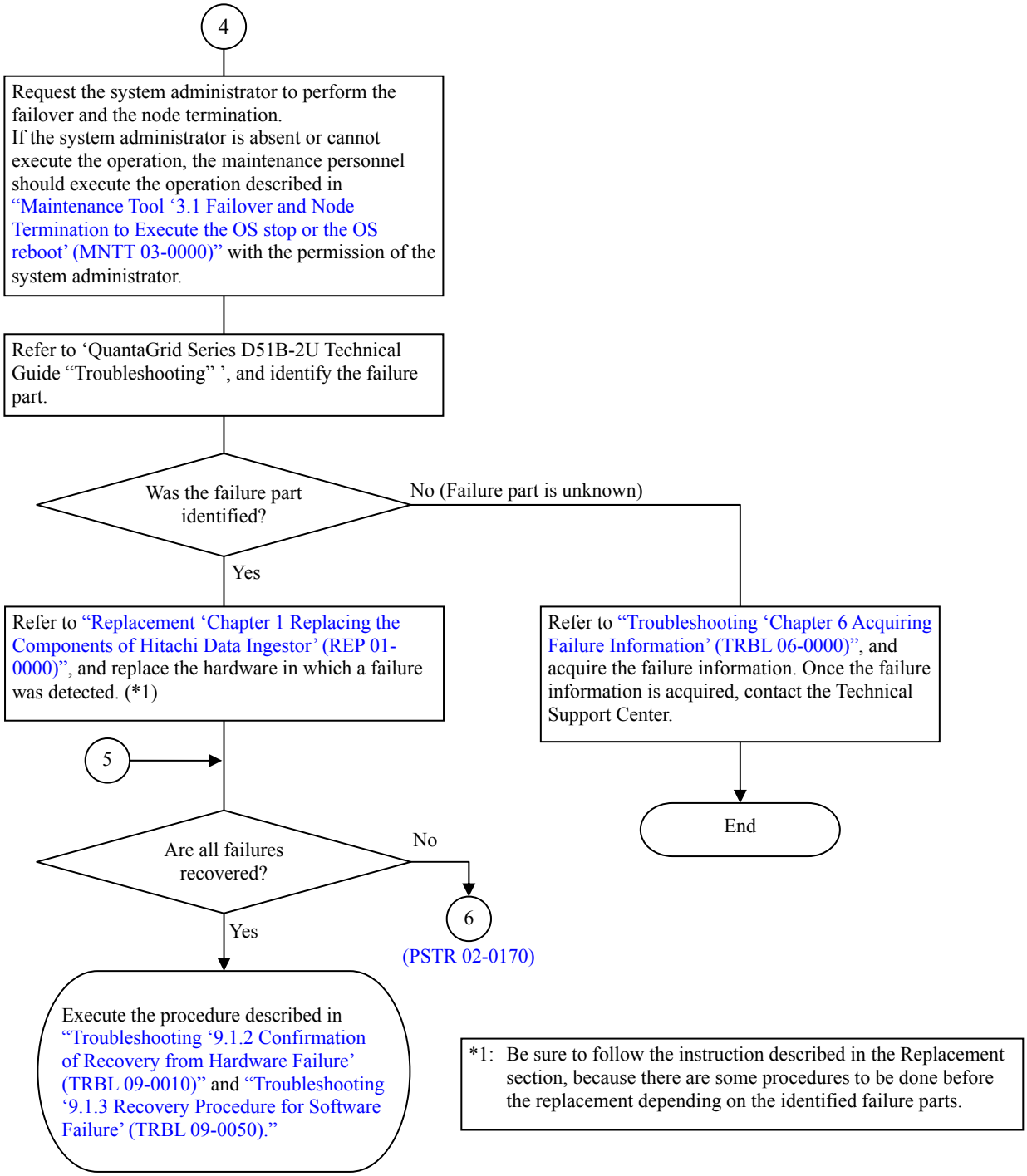

Figure C.2.2.1-1 Procedure for determining failures (5/5)

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Table C.2.2.1-1 Failed parts shown by SIM

#	SIM	Lamp status	Checking the status by the hwstatus command (*1)	Failed part
1	KAQG72012-W	—	Is the Heartbeat LAN port status “Link down”?	Heartbeat LAN port or Heartbeat LAN cable (*2) (*3)
2	KAQG81003-W	—	Is the port status “Link down”?	Extension NIC port or cable (*2) (*3)
3	KAQK31500-E	—	Is the power supply status “failed”?	One power supply unit
4	KAQK32500-E	—	Is the FAN status “failed”?	One FAN
5	KAQK37506-E	LED status that indicates the failed drive (*5)	Is the Internal HDD status “failed”?	One Internal drive
6	KAQK39504-E	—	Is the status of all ports of NIC “Link down”?	—
7	KAQK39527-E	—	—	Pool exhaustion (*4)

*1: For the hwstatus command, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus)’.
*2: When it is not recovered even if the cable is replaced, it is a port failure.
*3: In case of a port failure, ping from the management PC or maintenance PC, and specify which of the nodes has the port failure.
*4: Ask the system administrator to recover the pool exhaustion.
*5: For the LED status of drive, refer to “QuantaGrid Series D51B-2U Technical Guide”.

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C.2.2.2 Failure determination procedure at the single node configuration

In the single node configuration, a failure is determined to either a hardware system failure or a software system failure after checking the power supply. The entire flow of the failure determination is shown below.

NOTE:
- Because there are two configurations (HDI for Cloud configuration and Configuration of single node with spare for Cloud) in the single node configuration, make sure the target configuration before the operation. For the configuration, refer to "Installation '1.1.4 Overall configuration diagram (4) Overall system configuration diagram in the configuration of HDI for Cloud (single node)' (INST 01-0078)".
- If the File Version Restore Function is used, "data of the past version directory" might be inaccessible for a moment after the start-up of the resource groups. Contact the system administrator when the resource groups are to be started or restarted.
- If the logical failure is occured on the file system using the Active File Migration or the Large file transfer, the maintenance personnel might not be able to identify the failure location with the failure determination procedure. Before the completion maintenance procedure, inform system administrator that they can start recovering the work space for AFM.

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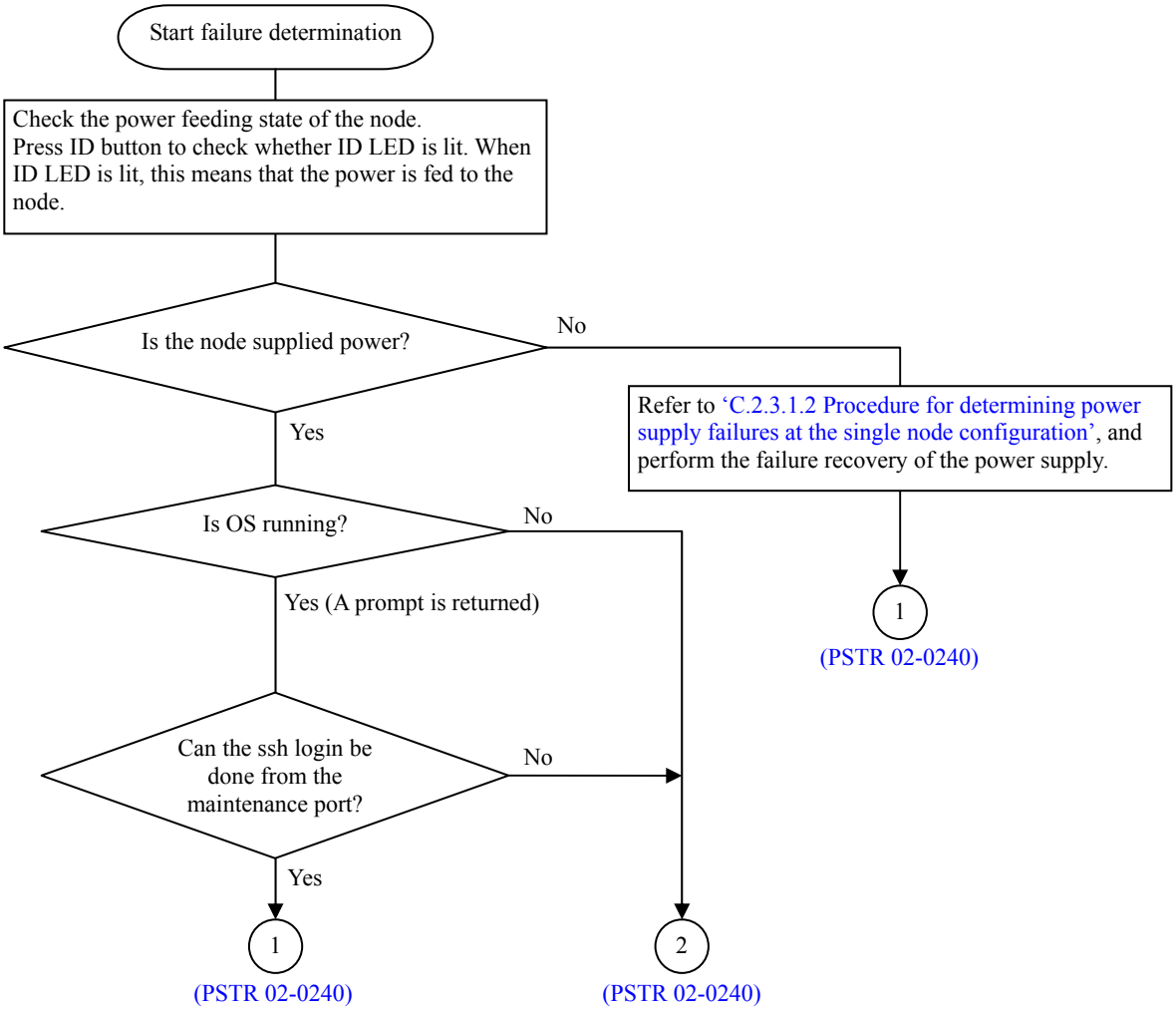

Figure C.2.2.2-1 Failure determination procedure in the single node configuration (1/2)

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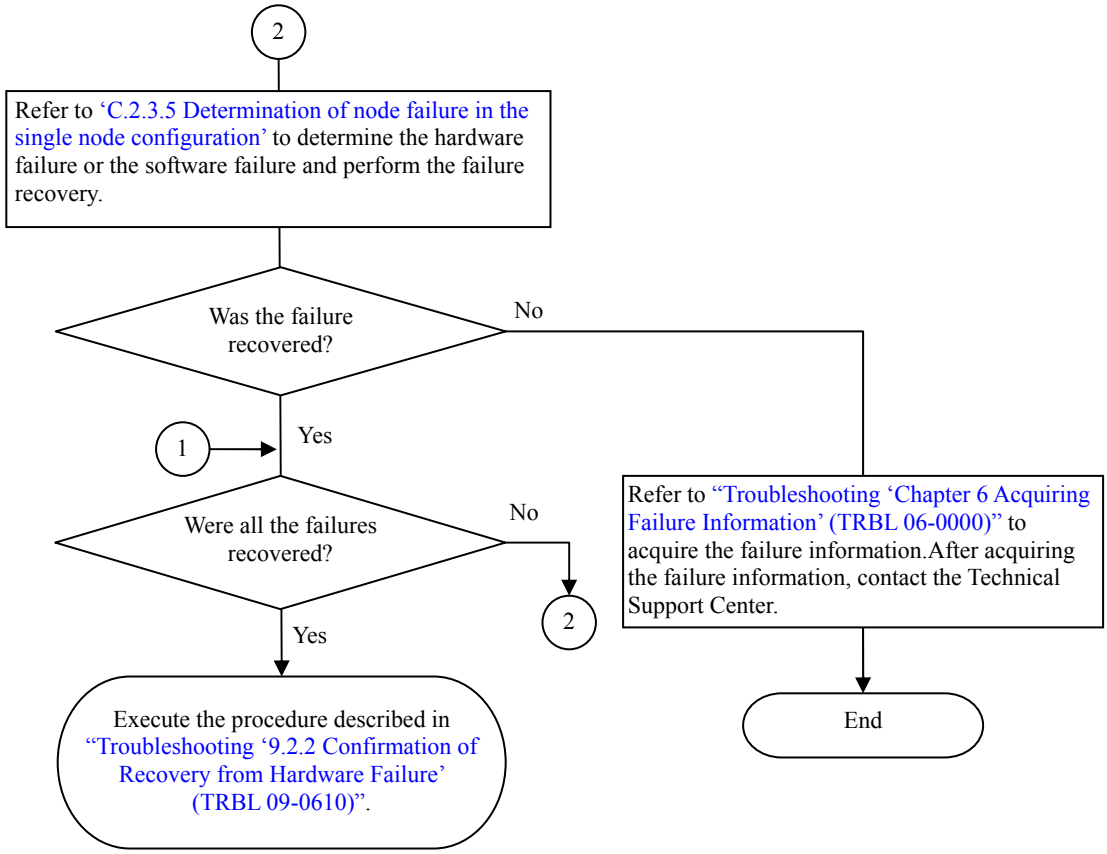

Figure C.2.2.2-1 Failure determination procedure in the single node configuration (2/2)

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C.2.3 Detailed Determination Procedure in Each Failure

C.2.3.1 Procedure for determining power supply failures

C.2.3.1.1 Procedure for determining power supply failures in the cluster configuration

The procedure for determining power supply failures is shown in the following flow.
It is assumed that, for one side node, at least one side power unit or the distribution board failure occurred.

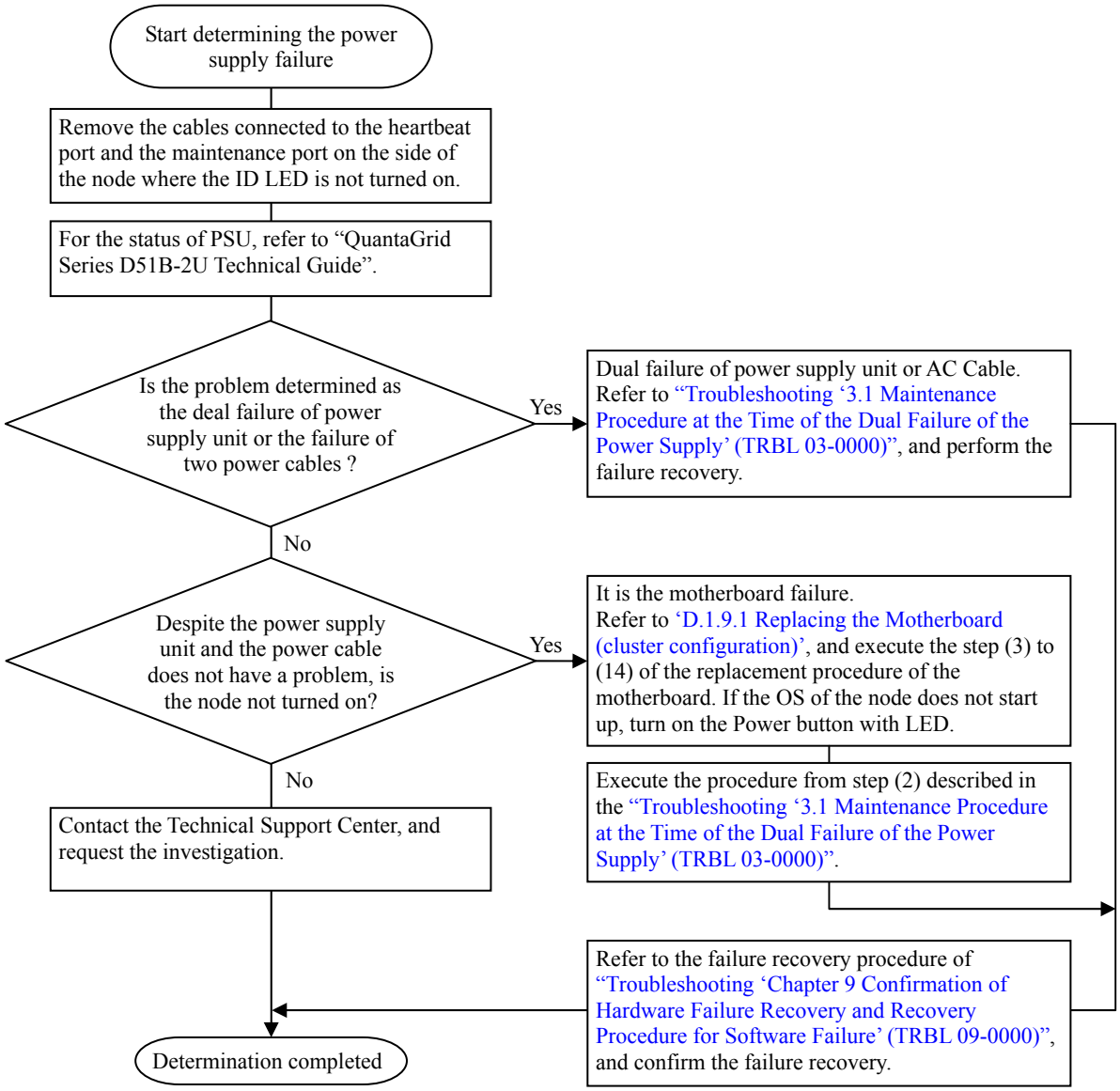

Figure C.2.3.1.1-1 Procedure for determining power supply failures

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C.2.3.1.2 Procedure for determining power supply failures at the single node configuration

The following flowchart shows the procedure of power supply failures. It is assumed that the power unit or a distribution board failure occurred.

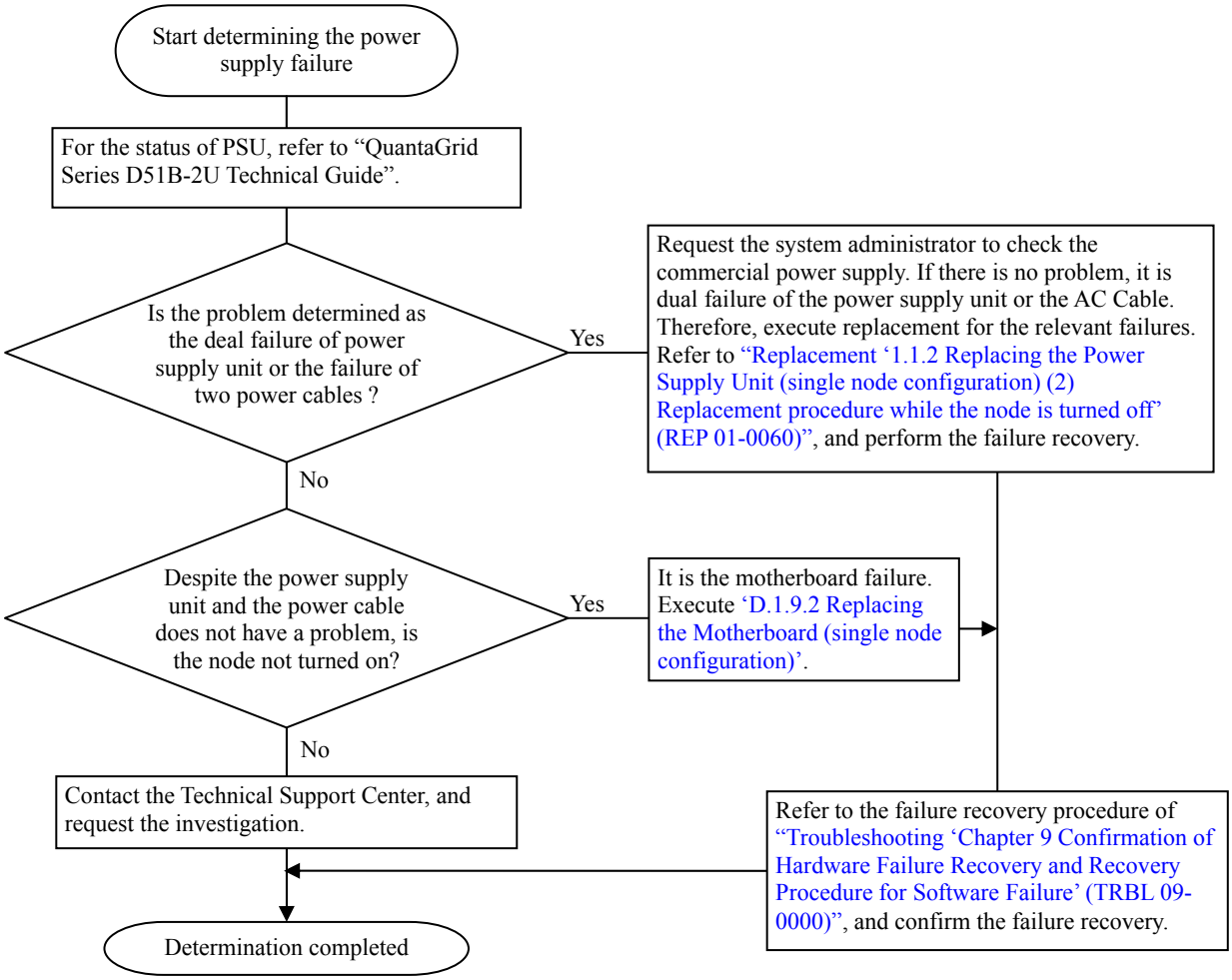

Figure C.2.3.1.2-1 Procedure for determining power supply failures

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C.2.3.2 Determination of management network failure

This chapter describes determination of the management network failure.

When the failure location can be identified from the failure notice, maintenance personnel should perform the recovery operation for the relevant location.

When the failure location cannot be identified, determine the failed part by the determination operation described in this chapter, and then perform the recovery operation.

Check the following before determining the failure.

Confirmation method varies depending on the model, however, confirm the status of Power LED and Status LED of IP-SW.

If Power LED is turned off, either power is turned off or power failure. Check the power switch, power cable of the management LAN IP-SW and the power supply that is fading to the management LAN IP-SW. When the power switch is not turned off and power supply cable and the power supply source have no problem, it is the IP-SW failure.

When Status LED indicates an error, refer to the manual of the target product and perform the troubleshooting.

Check whether the customer configuration is “BMC and Management SW connection configuration” or “BMC direct connection configuration” before performing ‘C.2.3.2.1 Failure determination by ping command execution result’. If customer cannot judge the configuration, maintenance personnel can find the configuration using the sequences as follows.

(1) If the network segment of the management port is the same as that of BMC port, the configuration is “BMC direct connection configuration”.

Refer to “Maintenance Tool ‘2.11 Displaying the Management Port Information (mngiflist)’ (MNTT 02-0800)” for check of the network segment of the management port.

Refer to “Maintenance Tool ‘2.18 Setting BMC LAN Information (bmcctl)’ (MNTT 02-1210)” for check of the network segment of the BMC port.

(2) If you cannot check the network segment, you must judge the configuration to check the cable connection.

If the BMC port is connected to the IP switch, the configuration is not “BMC direct connection configuration”. If the BMC port is connected to the reset port of the other node, the configuration is “BMC direct connection configuration”.

During the maintenance according to this section, some SIM messages may be issued when you plug in/out the network cable. In this section, do not refer the messages and do perform the isolation flow.

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C.2.3.2.1 Failure determination by ping command execution result

Before performing the operation of management network failure determination, obtain the result (node0: mng0, BMC0 and node1: mng1, BMC1) of the ping command executed by the system administrator. Then, perform the determination operation.
Refer to "Set Up '1.3 Startup confirmation of the OS by using KVM' (SETUP 01-0010)" for check of OS operation status.

(1) Figure 4.1 Overview of Checking by Using ping Command shows an overview of the checking by using the ping command.

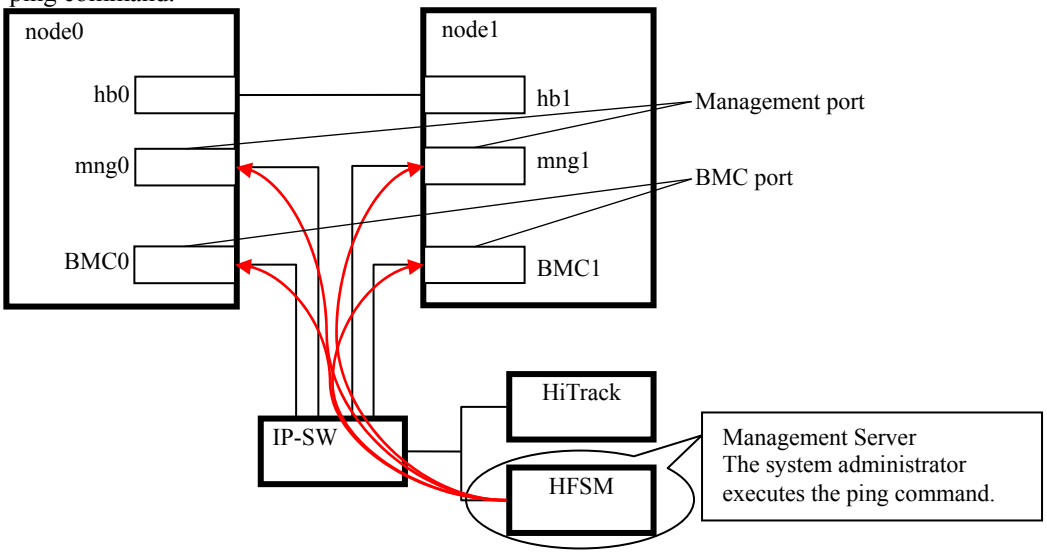

Figure C.2.3.2.1-1 Overview of Checking by Using ping Command

(2) In the case of "BMC direct connection configuration", connect the maintenance PC to pm0, and check the status of OS operation and each ports. If pm0 is in failure, connect the maintenance PC using RS232-C serial cable and check the OS operation status.

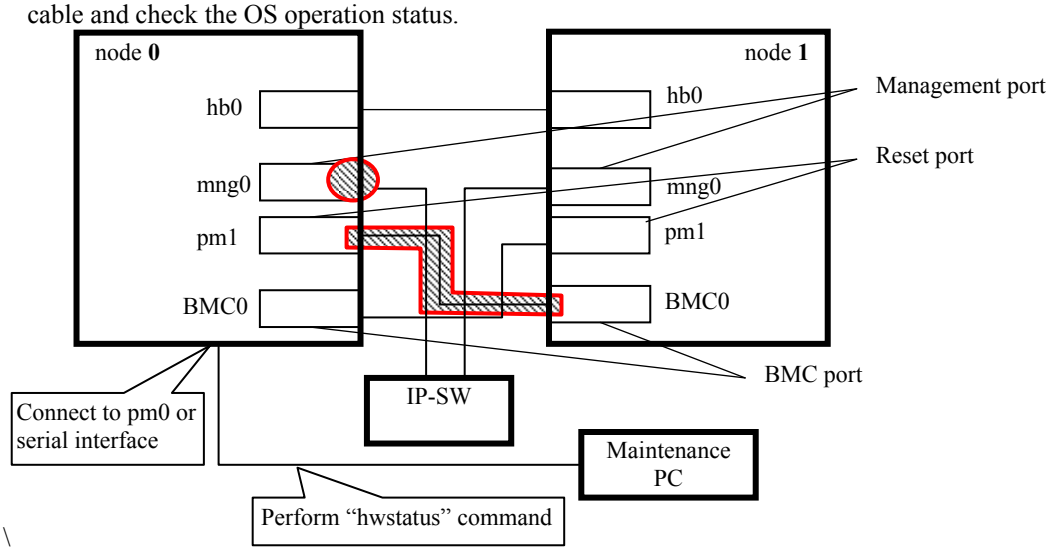

Figure C.2.3.2.1-2 Overview of Checking in the BMC direct connection configuration

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(2-a) Log in to node0 using maintenance PC via ssh or serial interface and check the OS prompt.
Refer to "Maintenance Tool '1.3 Procedures for Operating Commands' (MNTT 01-0200)" for Login.

(2-b) Perform "hwstatus" command to check the status of each port.
Check the mng0, BMC port, and reset port of the node0 (Refer to Figure C.2.3.2.1-3.)
Refer to 'B.3.1 Displaying the Hardware Status (hwstatus)' for the detail of the "hwstatus".

```
$ sudo hwstatus
                    —omitted —
BMC Information
 status             ok
 connection         ok
Network Interface
 mng0               up      linkspeed   : XXXXBase,mediatype:Copper,Management port
 hb0                down    linkspeed   : XXXXBase,mediatype:Copper,Heartbeat port
                    — omitted —
 pm1                up      linkspeed   : XXXXBase,mediatype:Copper,Private maintenance port
$
```

Figure C.2.3.2.1-3 Checking each port using hwstatus

(2-c) After (2-b), connect the maintenance PC to node1, and check the status of mng0, BMC port, and reset port to perform "hwstatus" if you can login to node1.

(2-d) Memorize the result to the table as follows.

Table C.2.3.2.1 Port status summary of BMC direct connection configuration

OS operation status(*1)		mng0(*2)		BMC port		Reset port	
node0	node1	node0	node1	node0	node1	node0	node1
				(*3) (*4)	(*3) (*5)	(*3) (*5)	(*3) (*4)

*1: Mark "up" if you can login from maintenance PC, and mark "down" if you cannot login from maintenance PC.
*2: Mark "Y" if mng0 status is "up", and mark "N" if mng0 status is "down".
If you cannot perform "hwstatus" because you cannot login to the OS, mark "-".
*3: If you cannot perform "hwstatus" because you cannot login to the OS, mark "-".
*4: According to the result of "hwstatus" on the node1,
mark "Y" if the BMC Information is "connection OK", and
mark "N" if the BMC Information is "connection Failed".
*5: According to the result of "hwstatus" on the node0,
mark "Y" if the BMC Information is "connection OK", and
mark "N" if the BMC Information is "connection Failed".

In the case the configuration is "BMC and Management SW connection configuration", based on the result of the ping command execution, determine the failure with reference to the 'Table C.2.3.2.1-1 Matrix Table of Management Network Failures'.
Determination process is the same when the judgment of Yes/No in node0 and node1 are switched.

In the case the configuration is "BMC direct connection configuration", based on the result of the Table C.2.3.2.1, determine the failure with reference to the 'Table C.2.3.2.1-1B Matrix Table of Network Failures in the BMC direct connection configuration.'

If there is no management network failure and the all results of the Y/N judgment for node 0 and node 1of each port shown in Table C.2.3.2.1-1 and Table C.2.3.2.1-2 are "Y", return to the calling process.

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Table C.2.3.2.1-1 Matrix Table of Management Network Failures

#	Management port		BMC port		OS operation status	Resource group operation status (*4)	Assumed failure	Failure determination procedure
	node0	node1	node0	node1				
1	Y	Y	N	N	Both nodes are in operation	Operating in both nodes (Online/No error)	Double failures in the BMC ports or the cables occurred.	Execute the flow of Figure C.2.3.2.2-1. 'C.2.3.2.2 Flow of Management Network Failure Determination (1) Failure in the BMC ports or the cables'
2	Y	Y	Y	N	Both nodes are in operation	Operating in both nodes (Online/No error)	A failure in the BMC ports or the cables occurred.	
3	Y	N	Y	Y	Both nodes are in operation (*1)	Operating in both node or one side node (Online/No error)	Failover (*2) occurred due to a failure in the management port or in the cables.	Execute the flow of Figure C.2.3.2.2-2. 'C.2.3.2.2 Flow of Management Network Failure Determination (2) Failure in the management port or the cables'
						Stopping resource groups in both nodes (The status is srmd executable error)	The resource groups of the both nodes are stopped abnormally because a failure occurs on the maintenance port or the cable, and then restarting is occurred on the other side node.	
					Only one node is in operation (*1)	Operating in one side node (Online/No error)	Reset has been issued due to OS down, and then the failover (*2) has occurred.	'C.2.3.4 Determining the node failure when failover occurred'
4	Y	N	Y	N	—	—	Double or more failures in the ports or the cables have occurred.	'Table C.2.3.2.1-2 Failure Status (Determination of Multiple Failures of #4 through #6)'
5	Y	N	N	Y	—	—	Double or more failures in the ports or the cables occurred.	
6	N	N	Y	Y	—	—	A wrong setting of the management port IP address, both nodes' operating systems down, double or more failures in the ports and the cables, or a failure on the disk array subsystem occurred.	
7	N	N	N	N	Both nodes are in operation (*3)	Operating in both nodes (Online/No error)	A failure in the management IP-SW occurred.	Execute the flow of Figure C.2.3.2.2-10. 'C.2.3.2.2 Flow of Management Network Failure Determination (10) Failure in the management IP-SW'

Y: ping response is returned, N: ping response is not returned

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*1: At the site where the Management LAN IP-SW provided by (HDS) is installed, connect the maintenance PC to the management LAN IP-SW, and check the OS operation status by the ping confirmation for the node that cannot communicate with the management port. If the ping communication is available, determine that the both nodes are in operation.
At the site where the Management LAN IP-SW owned by the customer is installed, connect the maintenance PCs to the maintenance ports of the both nodes directly, and check the OS operation status by the ping confirmation. If the ping communication is available, determine that the both nodes are in operation.
If the ping communication is not available, just one side node is in operation.

*2: When the failover of resource group is complete, "Running node" of the both resource groups becomes the same node name. For the details about "Running node", refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)".

*3: Connect the maintenance PC directly to the maintenance ports of both nodes and check the OS operation status by the ping communication. If the ping communication is available, determine that the node is in operation.

*4: Check the resource group operation status when the resource group is in operation. When the resource group is in operation, check the operation status.

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Table C.2.3.2.1-1B Matrix Table of Network Failures in the BMC direct connection configuration (1/2)

#	OS operation status		Management port (mng0)		BMC port (BMC)		Reset port (pm1)		Assumed failure	Failure determination procedure
	node0	node1	node0	node1	node0	node1	node0	node1		
1	up	up	Y	Y	Y	N	N	Y	One or two failure(s) in the BMC ports, the reset ports of the other node, or the cables occurred.	Execute the flow of Figure C.2.3.2.2-1.
					N	Y	Y	N		
					N	N	N	N		
2	up	up	Y	N	Y	Y	Y	Y	A failure in the management ports or the cables occurred.	Execute the flow of Figure C.2.3.2.2-2.
			N	Y	Y	Y	Y	Y		
3	up	up	Y	N	Y	N	N	Y	Double or more failures in the ports or the cables have occurred. - mng0/cable - BMC port of the same node (or Reset port /cable of the other node) [note] If management port have the service IP, failover had been occurred and service is continued. Maintain the offline node first.	Execute the flow of Figure C.2.3.2.2-3.
			N	Y	N	Y	Y	N		
4	up	up	Y	N	N	Y	Y	N	Double or more failures in the ports or the cables have occurred. - mng0/cable - Reset port of the same node (or BMC port /cable of the other node) [note] When you replace the BMC port, we must stop all services. Maintain “mng0 failed node” first.	Execute the flow of Figure C.2.3.2.2-5.
			N	Y	Y	N	N	Y		
5	up	up	N	N	Y	Y	Y	Y	A failure in the management IP-SW, mng0, or setting mistake occurred.	Execute the flow of Figure C.2.3.2.2-7.

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Table C.2.3.2.1-1B Matrix Table of Network Failures in the BMC direct connection configuration (2/2)

#	OS operation status		Management port (mng0)		BMC port (BMC)		Reset port (pm1)		Assumed failure	Failure determination procedure
	node0	node1	node0	node1	node0	node1	node0	node1		
6	up	down	Y	–	–	Y	Y	–	Failover occurred because of OS down. (*1)	Execute the flow of Figure C.2.3.2.2-6.
	down	up	-	Y	Y	–	–	Y		
7	up	down	Y	–	–	N	N	–	Double or more failures have occurred. - OS down - Reset port of the same node (or BMC port /cable of the other node) [note] The service is continued. Maintain the failed node after stopping the service of the failed node.	Execute the flow of Figure C.2.3.2.2-4.
	down	up	–	Y	N	–	–	N		
8	up	down	N	–	–	Y	Y	–	Double or more failures have occurred. - OS down - Mng0 port of the other node	Execute the flow of Figure C.2.3.2.2-8.
	down	up	–	N	Y	–	–	Y		
9	down	down	–	–	–	–	–	–	OS double failures (including software failures) have occurred.	Execute the flow of Figure C.2.3.2.2-9.

*1: When the failover of the resource group is completed, the “Running node” status of the both node show us the same node name. Refer to “Maintenance Tool ‘2.2 Displaying the Cluster Status (clstatus)’ (MNTT 02-0040)” for the detail of the “Running node”.

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Table C.2.3.2.1-2 Failure Status (Determination of Multiple Failures of #4 through #6) (1/2)

Item number in Table C.2.3.2.1-1	Condition for determination		Details of failure	Recovery operation	Failure determination procedure (*3)
	Failover completion (*1)	OS operation status			
4	Y or N	Both nodes are in operation (*4)	Failures have occurred in the management port/cable, BMC port/cable of the same nodes.	Perform failover when the virtual IP address is set on the management port. The OS service continues running. Replace the failed part.	Execute the flow of Figure C.2.3.2.2-3.
	Y	Only one node is in operation (*4)	Failures of OS down and of BMC port/cable have occurred on the same node.	The OS service is continued. However terminate the service on the failure side, and then replace the failed part.	Execute the flow of Figure C.2.3.2.2-4.
5	Y or N	Both nodes are in operation (*2)	① A failure has occurred in the BMC port/cable. ② A failure has occurred also in the management port/cable of the other node.	Perform the management port recovery operation first, because if you perform the BMC port recovery operation first, the node in normal service must be terminated.	Execute the flow of Figure C.2.3.2.2-5.
	Y	Only one node is in operation (*2)	① Reset has been issued due to OS down, and the failover is being executed. ② A failure has occurred in the BMC port/cable of the other node.	Perform the replacement operation for the OS downed node first, because if you perform the replacement operation for the BMC port first, the node which can be failed over will not exist.	Execute the flow of Figure C.2.3.2.2-6.

*1: Failover completed: Y, Failover not completed: N.
When resource groups are in operation and the failovers are complete, "Running node" of the both resource groups becomes the same node name. For the details about "Running node", refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)".

*2: Check the logon prompt indication for the node that cannot communicate with the management port with the connection by the remote console. In the node displaying the logon prompt, the OS is in operation. And for the node that can communicate with the management port, determine that the node is in operation.
For the remote console connection, refer to 'B.1.3 Connection Confirmation of the Remote Console' and for the OS operation status, refer to 'B.1.4 Startup Confirmation of the OS by Using Remote Console'.

*3: For the failure determination procedures, follow 'C.2.3.2.2 Flow of management network failure determination'.

*4: At the site where the Management LAN IP-SW provided by (HDS) is installed, connect the maintenance PC to the management LAN IP-SW, and check the OS operation status by the ping confirmation for the node that cannot communicate with the management port. If the ping communication is available, determine that the both nodes are in operation.
At the site where the Management LAN IP-SW owned by the customer is installed, connect the maintenance PCs to the maintenance ports of the both nodes directly, and check the OS operation status by the ping confirmation. If the ping communication is available, determine that the both nodes are in operation.
If the ping communication is not available, just one side node is in operation. In this case, borrow a monitor and a keyboard to be connected to the node from the system administrator because the confirmation might not be available by the remote console connection.

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Table C.2.3.2.1-2 Failure Status (Determination of Multiple Failures of #4 through #6) (2/2)

Item number in Table C.2.3.2.1-1	Condition for determination			Details of failure	Recovery operation	Failure determination procedure (*3)
	Failover completion (*1)	OS operation status (*2)	Resource group operation status (*5)			
6	Y or N	Both nodes are in operation	Both nodes are in operation (Online/No error)	Failures have occurred in the management port/cable of the both nodes. (*4)	As the communication is enabled via the heartbeat cable, the OS service is continued. Execute the replacement operation for each node one by one by terminating it by manual failover.	Execute the flow of Figure C.2.3.2.2-7.
	Y	Only one node is in operation	Only one node is in operation (Online/No error)	① Reset has been issued due to the OS outage, and the failover is being executed. ② After the failover completion, a failure has occurred in the management port/cable of the other node.	As the OS service is continued by the failover, execute the replacement operation by terminating the node of failed OS.	Execute the flow of Figure C.2.3.2.2-8.
	Y	Only one node is in operation	Resource groups of both nodes terminated (Error status is srmd executable error)	After a failure occurred on the side of the maintenance port and failover is executed, a failure of the service termination on both nodes occurred due to OS down on the other side node.	Terminate the node that failed, and recover it.	
	N	No node is in operation	Command cannot be executed because no node is in operation.	OS double failures have occurred.	Execute checking by using the diagnostic tool of the hardware vendor. Check also the Disk Array Subsystem.	Execute the flow of Figure C.2.3.2.2-9.

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*1: Failover completed: Y, Failover not completed: N.
When the resource groups are in operation and the failovers are complete, “Running node” of the both resource groups becomes the same node name. For the details about “Running node”, refer to “Maintenance Tool ‘2.2 Displaying the Cluster Status (clstatus)’ (MNTT 02-0040)”.

*2: Check the logon prompt indication of node by connecting the remote console. In the node displaying the logon prompt, the OS is in operation. By switching the logon prompt indication confirmation in each place of connecting node, the state of both nodes operation can be checked.
For the remote console connection, refer to ‘B.1.3 Connection Confirmation of the Remote Console’ and for the OS operation status, refer to ‘B.1.4 Startup Confirmation of the OS by Using Remote Console’.

*3: For the failure determination procedures, follow ‘C.2.3.2.2 Flow of management network failure determination’.

*4: There is a case that Failover does not occur, and a case that Failover has completed. Failover does not occur when a case that the maintenance ports of the both nodes have failed at the same time.

*5: Check the resource group operation status when the resource group is in operation. When the resource group is in operation, check the operation status.

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C.2.3.2.2 Flow of management network failure determination

By following this section, perform the operation of the management network failure determination.

Execute the failure determination flow by following “Table C.2.3.2.1-1 Matrix of Management Network Failures”, “Table C.2.3.2.1-1B Matrix of Network Failures in the BMC direct connection configuration”, or “Table C.2.3.2.1-2 Failure Status (Determination of Multiple Failures of #4 through #6)”.

(1) Failure in the BMC ports or the cables

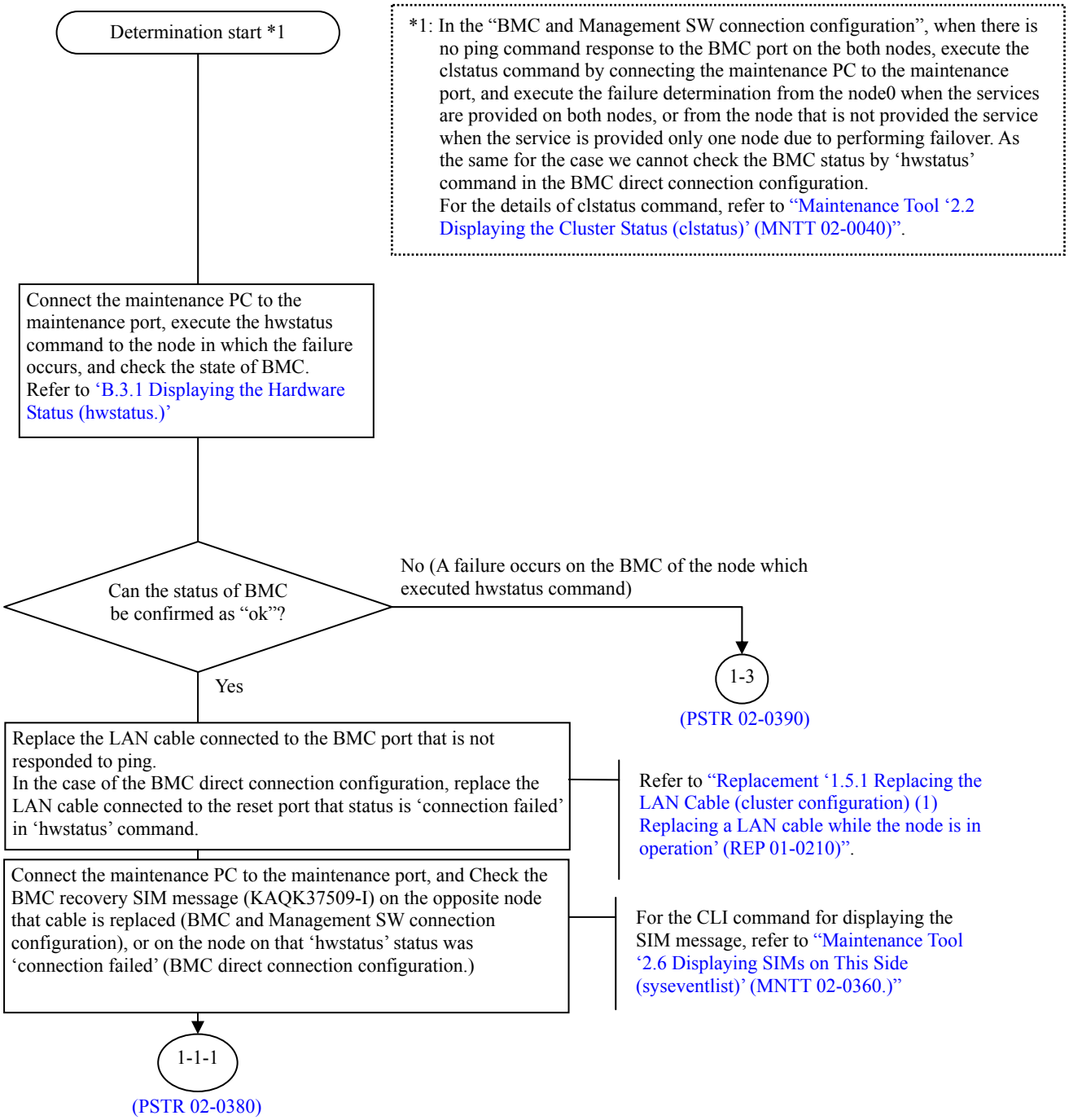

Figure C.2.3.2.2-1 Flow of Management Network Failure Determination (1/9)

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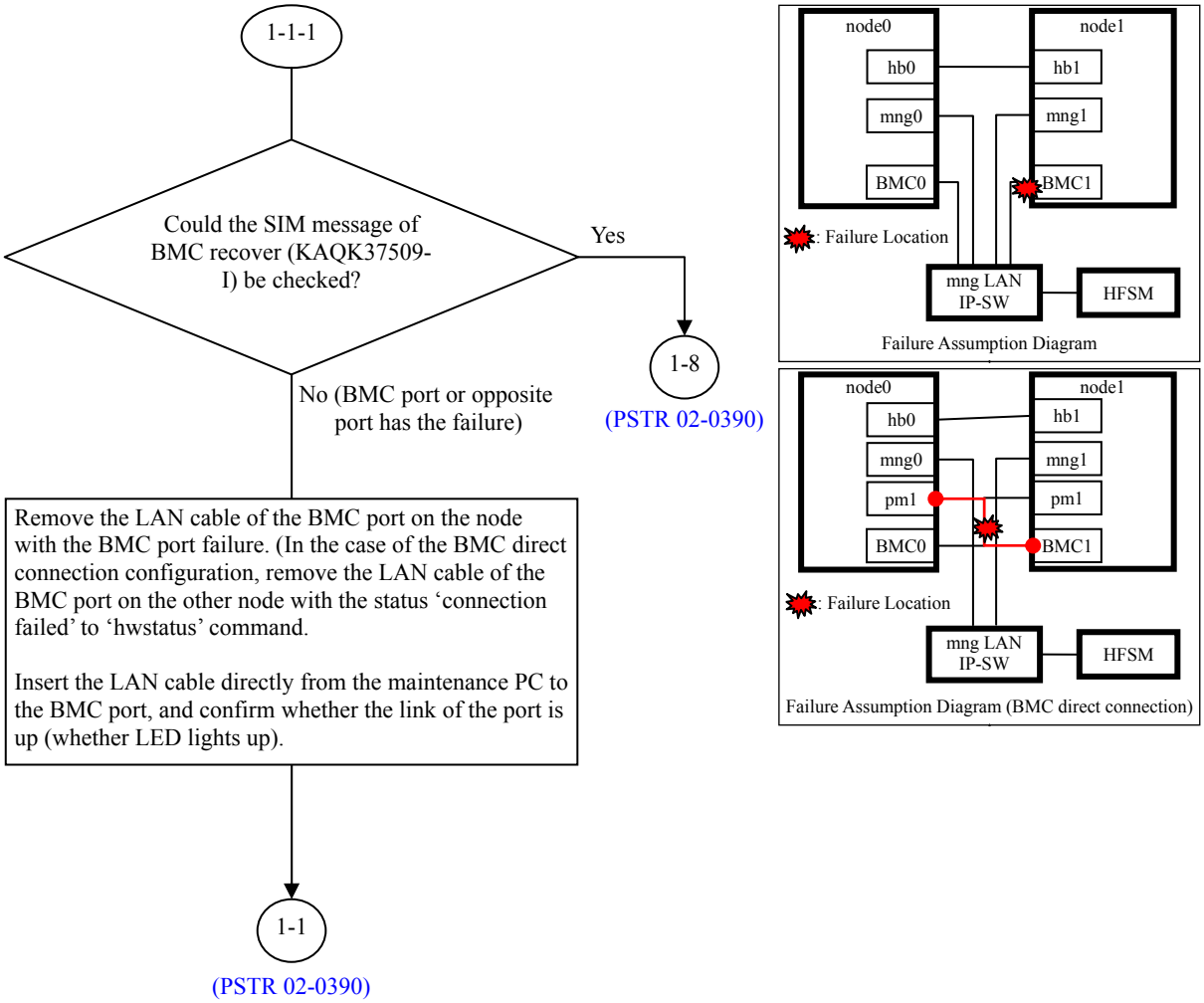

Figure C.2.3.2.2-1 Flow of Management Network Failure Determination (2/9)

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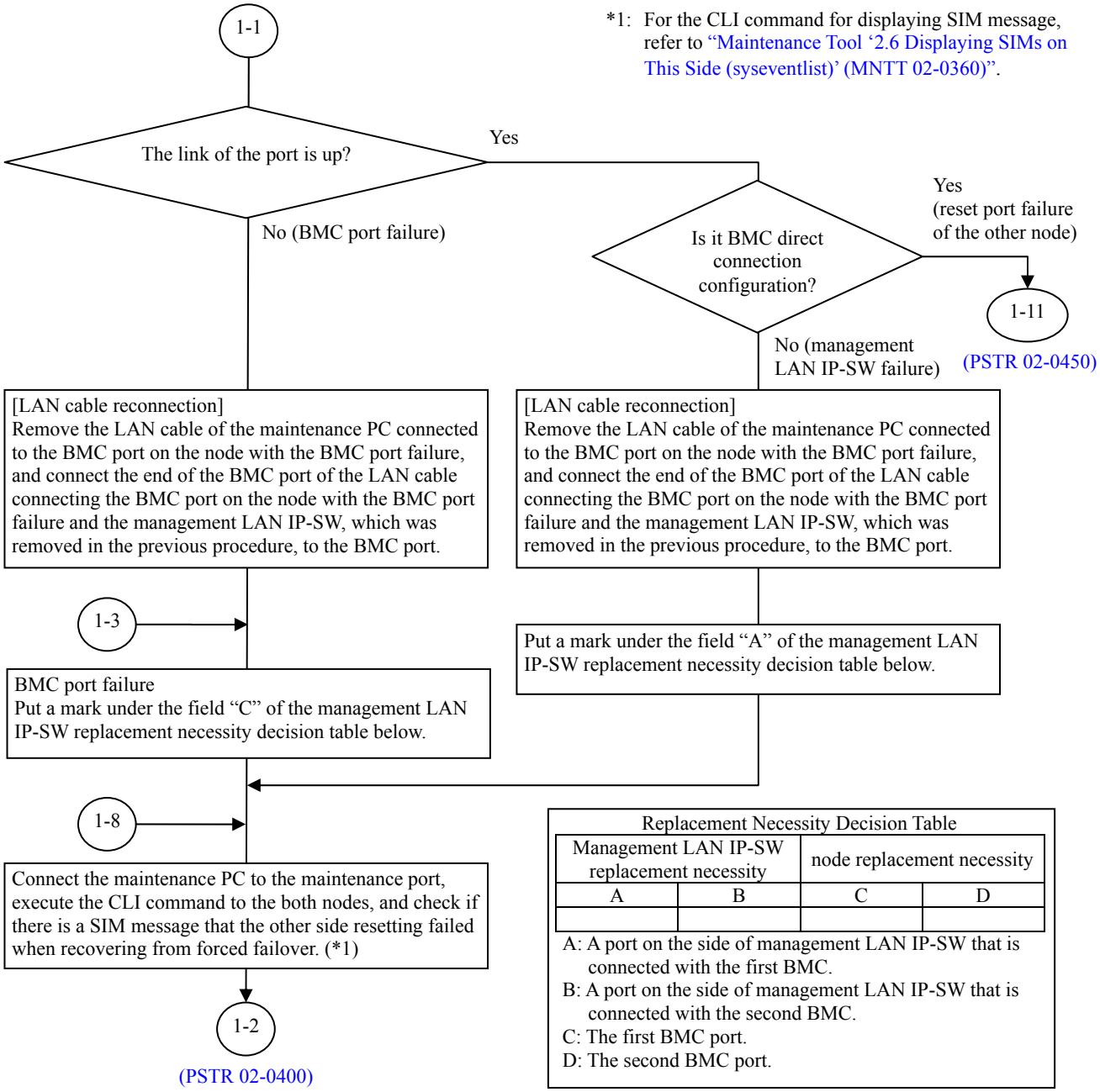

Figure C.2.3.2.2-1 Flow of Management Network Failure Determination (3/9)

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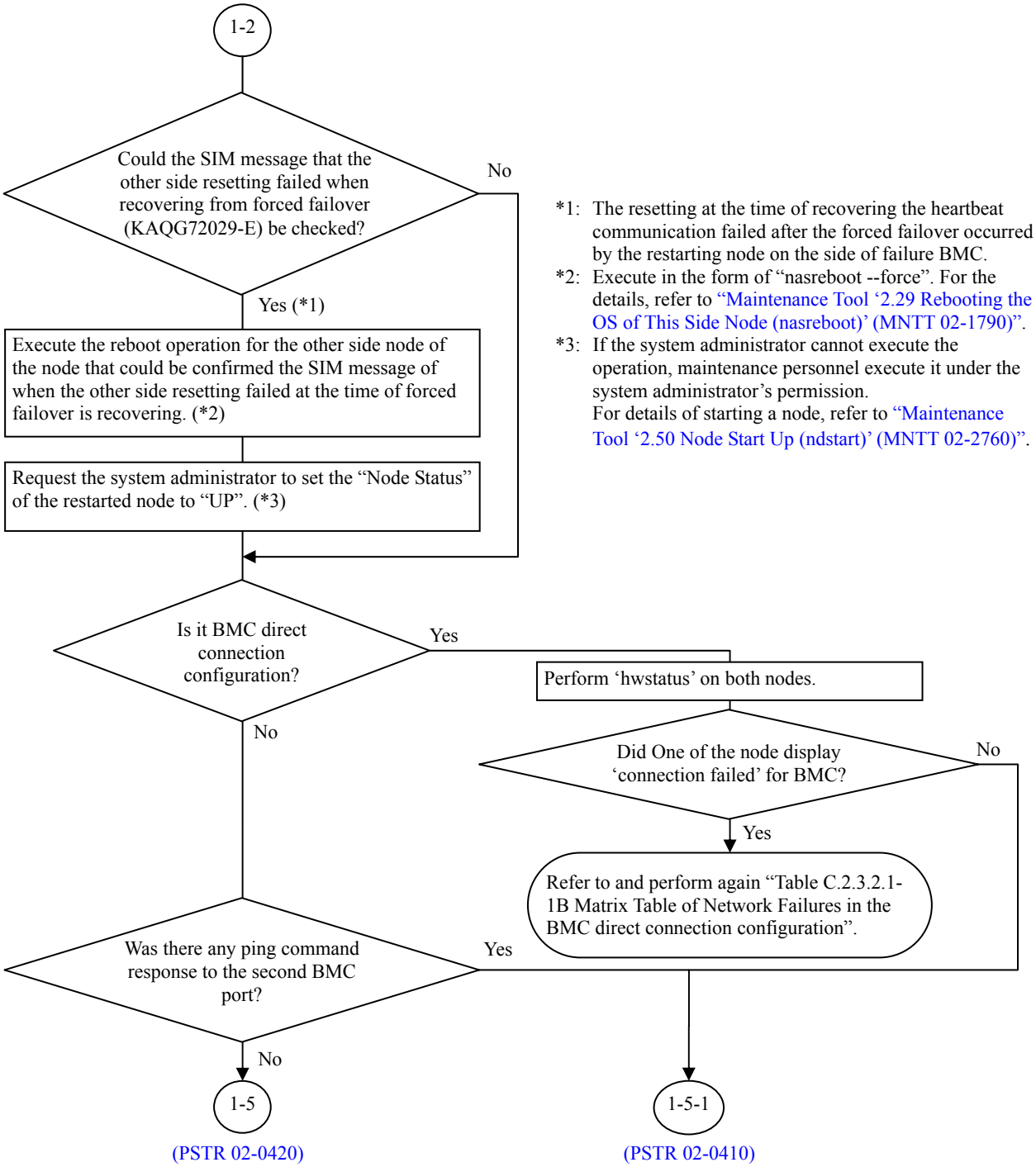

*1: The resetting at the time of recovering the heartbeat communication failed after the forced failover occurred by the restarting node on the side of failure BMC.

*2: Execute in the form of "nasreboot --force". For the details, refer to "Maintenance Tool '2.29 Rebooting the OS of This Side Node (nasreboot)' (MNTT 02-1790)".

*3: If the system administrator cannot execute the operation, maintenance personnel execute it under the system administrator's permission.
For details of starting a node, refer to "Maintenance Tool '2.50 Node Start Up (ndstart)' (MNTT 02-2760)".

Figure C.2.3.2.2-1 Flow of Management Network Failure Determination (4/9)

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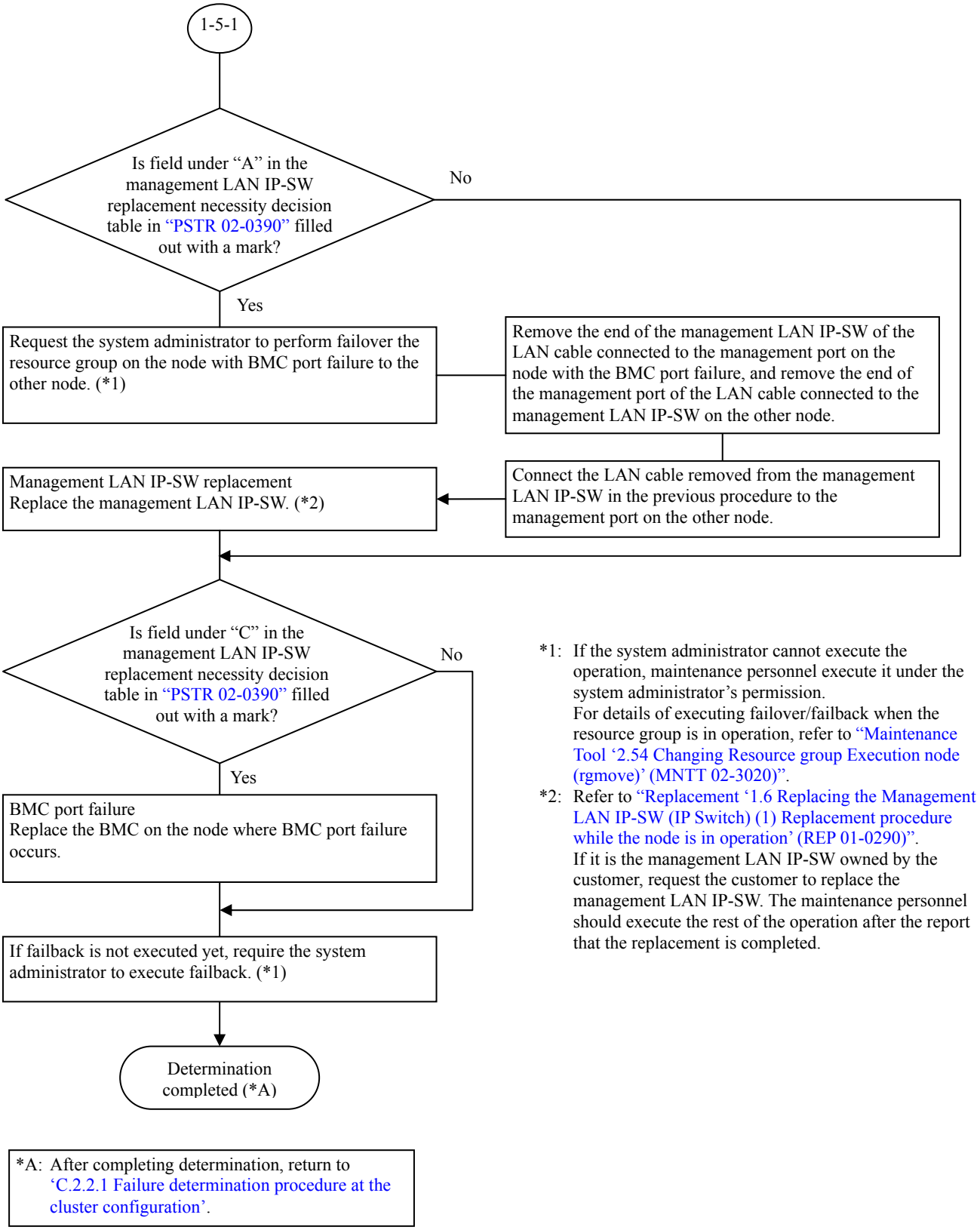

Figure C.2.3.2.2-1 Flow of Management Network Failure Determination (5/9)

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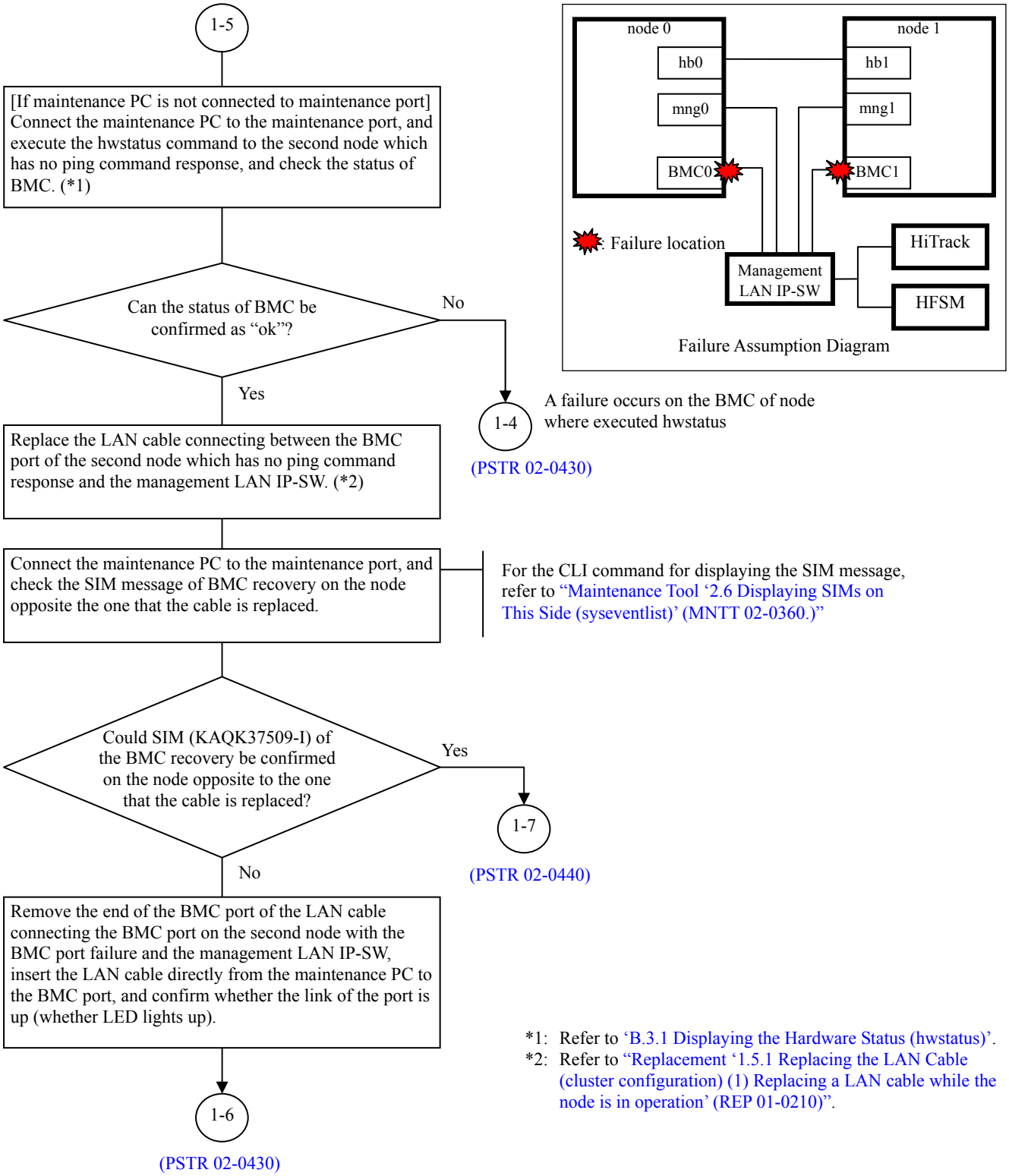

*1: Refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.
*2: Refer to "Replacement '1.5.1 Replacing the LAN Cable (cluster configuration) (1) Replacing a LAN cable while the node is in operation' (REP 01-0210)".

Figure C.2.3.2.2-1 Flow of Management Network Failure Determination (6/9)

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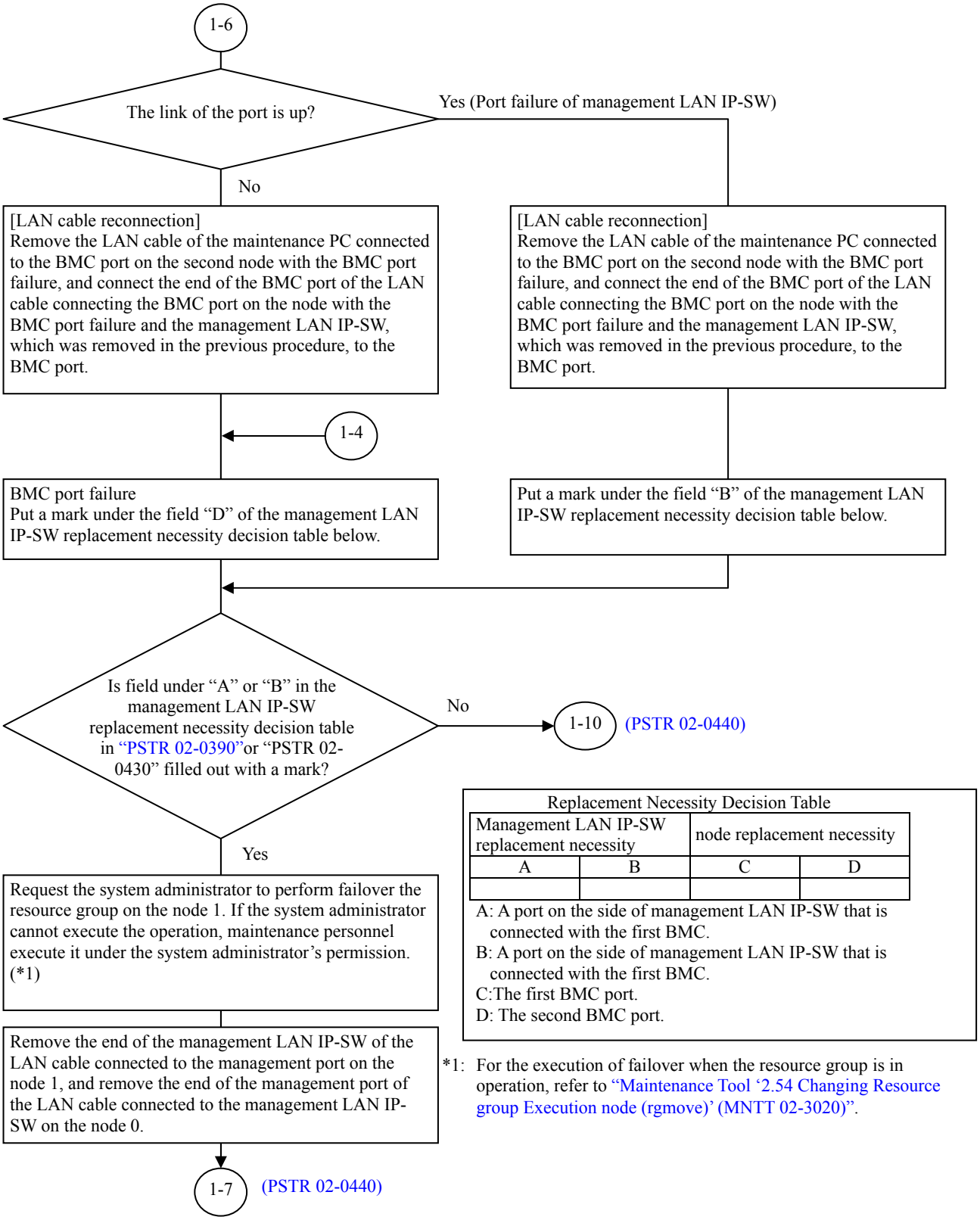

Replacement Necessity Decision Table

Management LAN IP-SW replacement necessity		node replacement necessity	
A	B	C	D

A: A port on the side of management LAN IP-SW that is connected with the first BMC.
B: A port on the side of management LAN IP-SW that is connected with the first BMC.
C:The first BMC port.
D: The second BMC port.

*1: For the execution of failover when the resource group is in operation, refer to "Maintenance Tool '2.54 Changing Resource group Execution node (rgmove)' (MNTT 02-3020)".

Figure C.2.3.2.2-1 Flow of Management Network Failure Determination (7/9)

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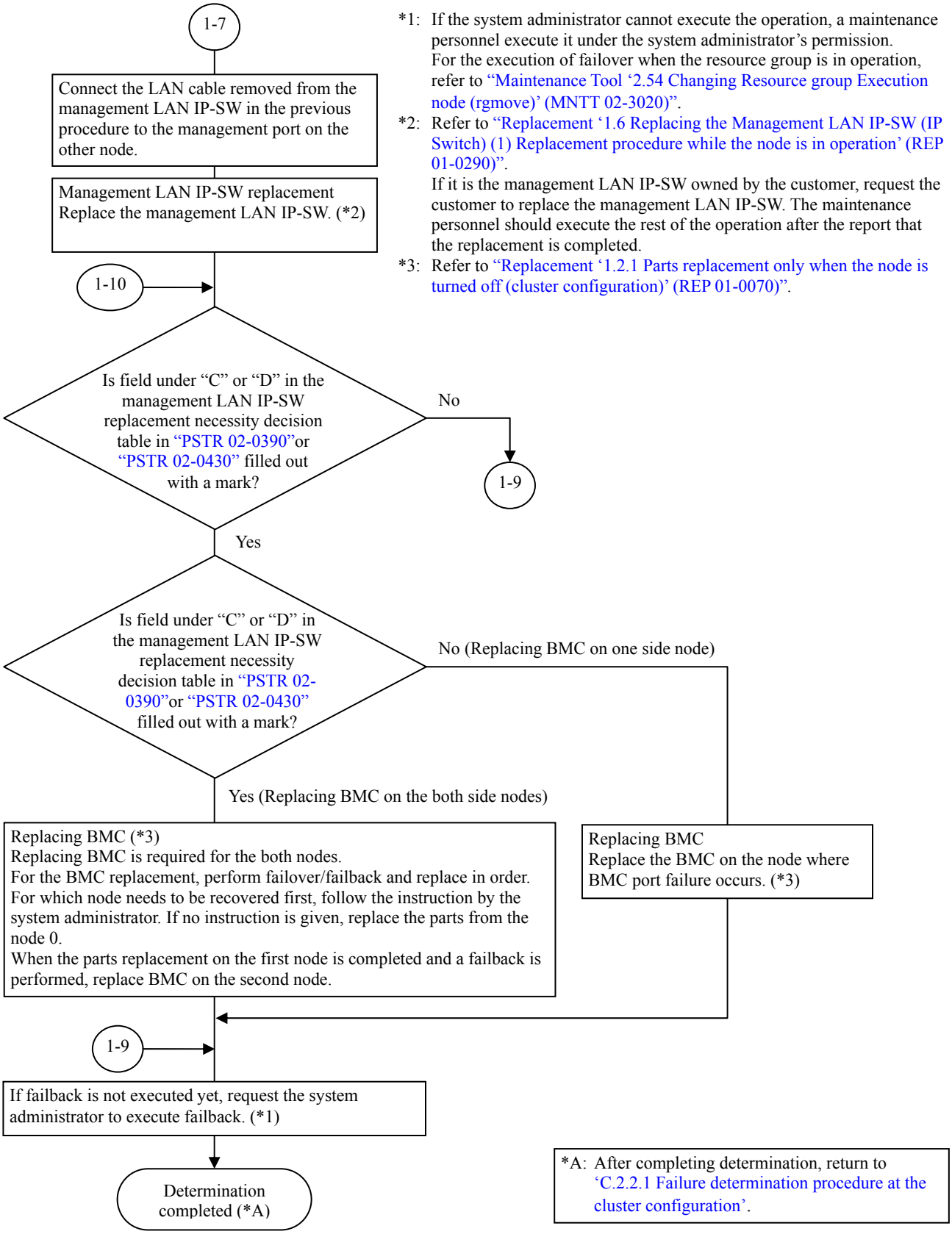

*1: If the system administrator cannot execute the operation, a maintenance personnel execute it under the system administrator's permission.
For the execution of failover when the resource group is in operation, refer to "Maintenance Tool '2.54 Changing Resource group Execution node (rgmove)' (MNTT 02-3020)".

*2: Refer to "Replacement '1.6 Replacing the Management LAN IP-SW (IP Switch) (1) Replacement procedure while the node is in operation' (REP 01-0290)".
If it is the management LAN IP-SW owned by the customer, request the customer to replace the management LAN IP-SW. The maintenance personnel should execute the rest of the operation after the report that the replacement is completed.

*3: Refer to "Replacement '1.2.1 Parts replacement only when the node is turned off (cluster configuration)' (REP 01-0070)".

*A: After completing determination, return to 'C.2.2.1 Failure determination procedure at the cluster configuration'.

Figure C.2.3.2.2-1 Flow of Management Network Failure Determination (8/9)

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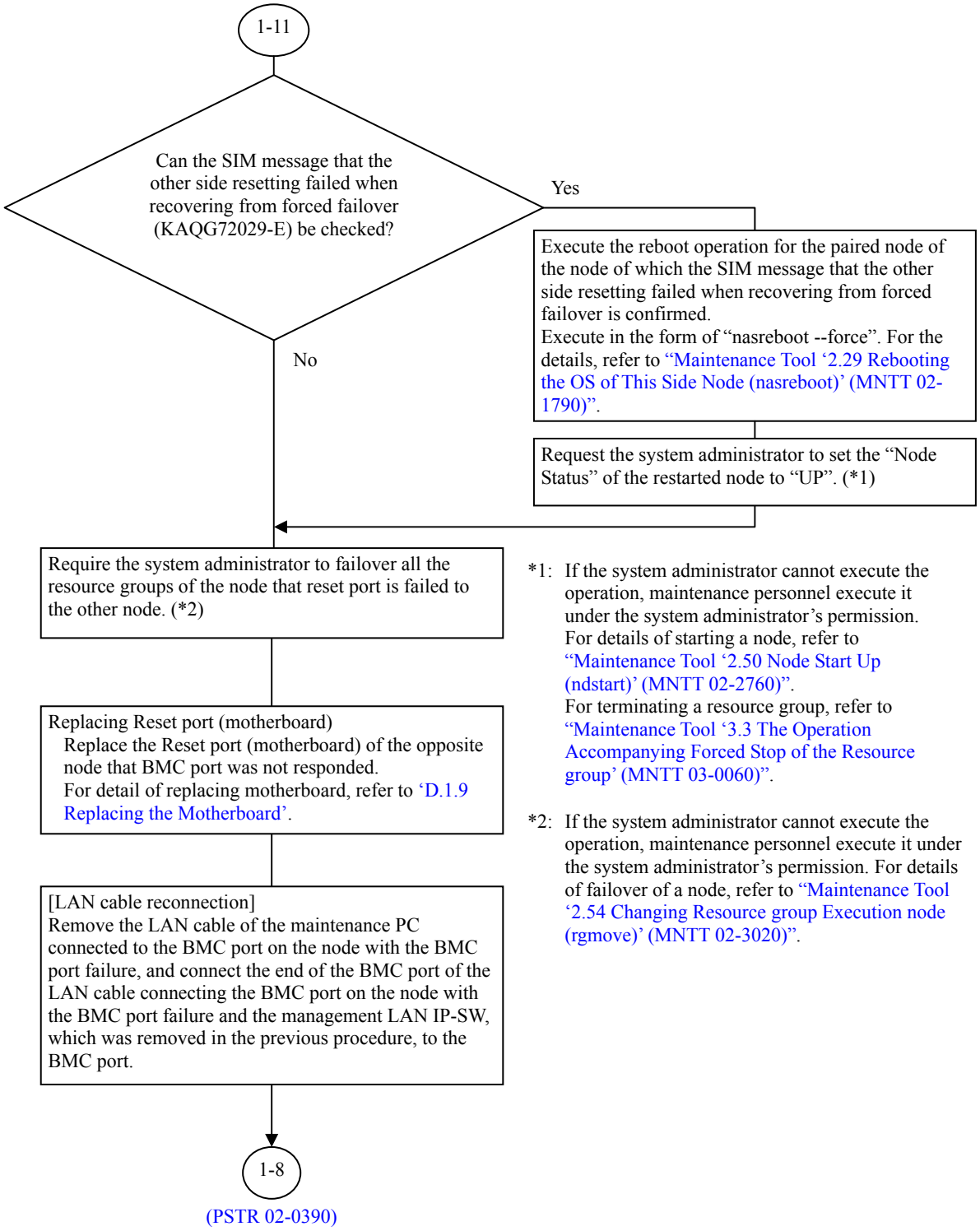

Figure C.2.3.2.2-1 Flow of Management Network Failure Determination (9/9)

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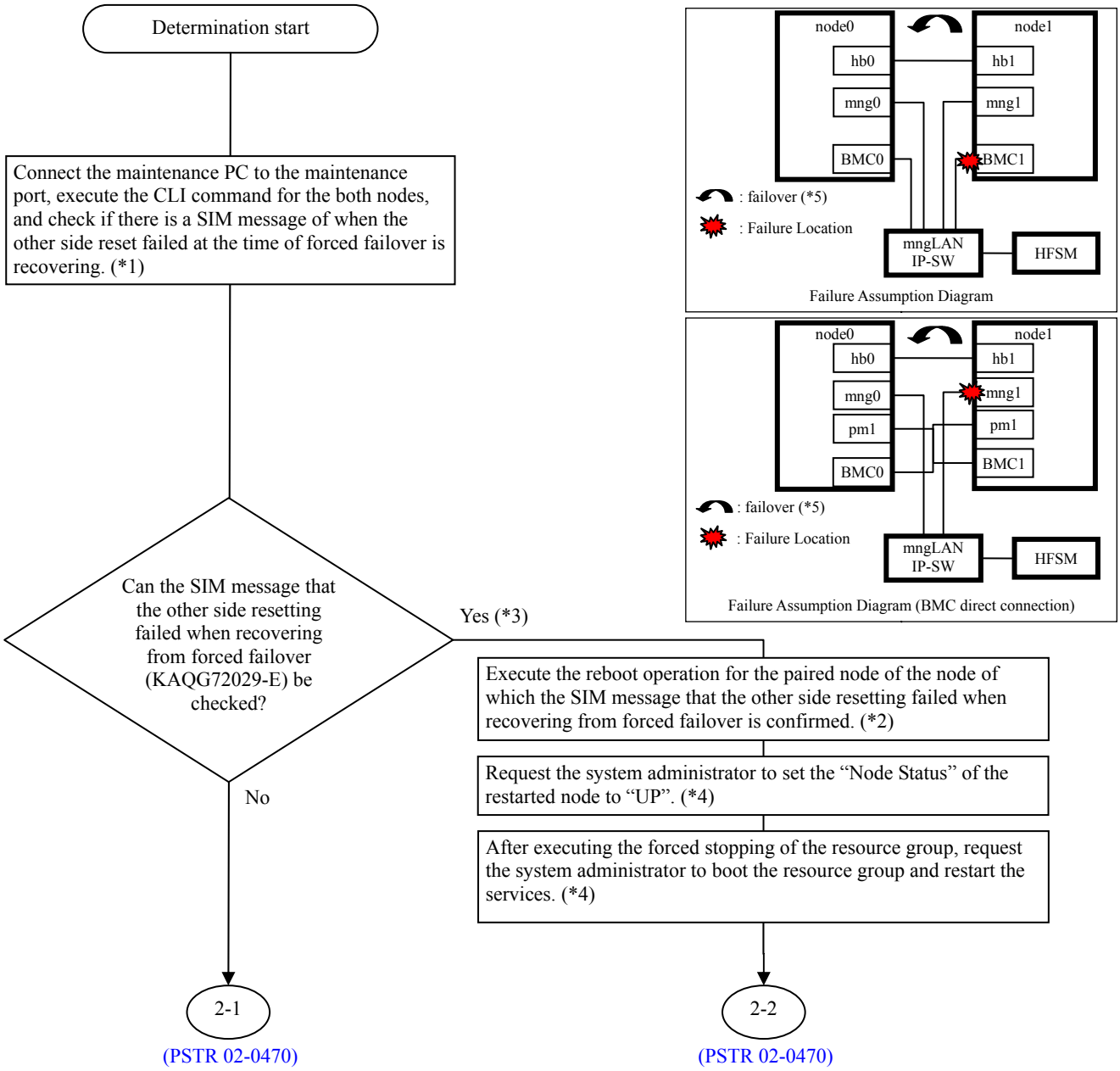
(2) Failure in the management port or the cables



*1: For the CLI command for displaying the SIM messages, refer to "Maintenance Tool '2.6 Displaying SIMs on This Side (syseventlist)' (MNTT 02-0360)".

*2: Execute in the form of "nasreboot --force". For the details, refer to "Maintenance Tool '2.29 Rebooting the OS of This Side Node (nasreboot)' (MNTT 02-1790)".

*3: The resetting at the time of recovering the heartbeat communication failed, after the occurrence of a forced failover by rebooting of node that opposite to the one where a failure occurred on the maintenance port. [srmd executable error] is displayed on the error status of a resource group.

*4: If the system administrator cannot execute the operation, maintenance personnel execute it under the system administrator's permission. For details of starting a node, refer to "Maintenance Tool '2.50 Node Start Up (ndstart)' (MNTT 02-2760)". For terminating a resource group, refer to "Maintenance Tool '3.3 The Operation Accompanying Forced Stop of the Resource group' (MNTT 03-0060)".

*5: In some cases of management port / cable failure, failover might not be occurred.

Figure C.2.3.2.2-2 Flow of Management Network Failure Determination (1/3)

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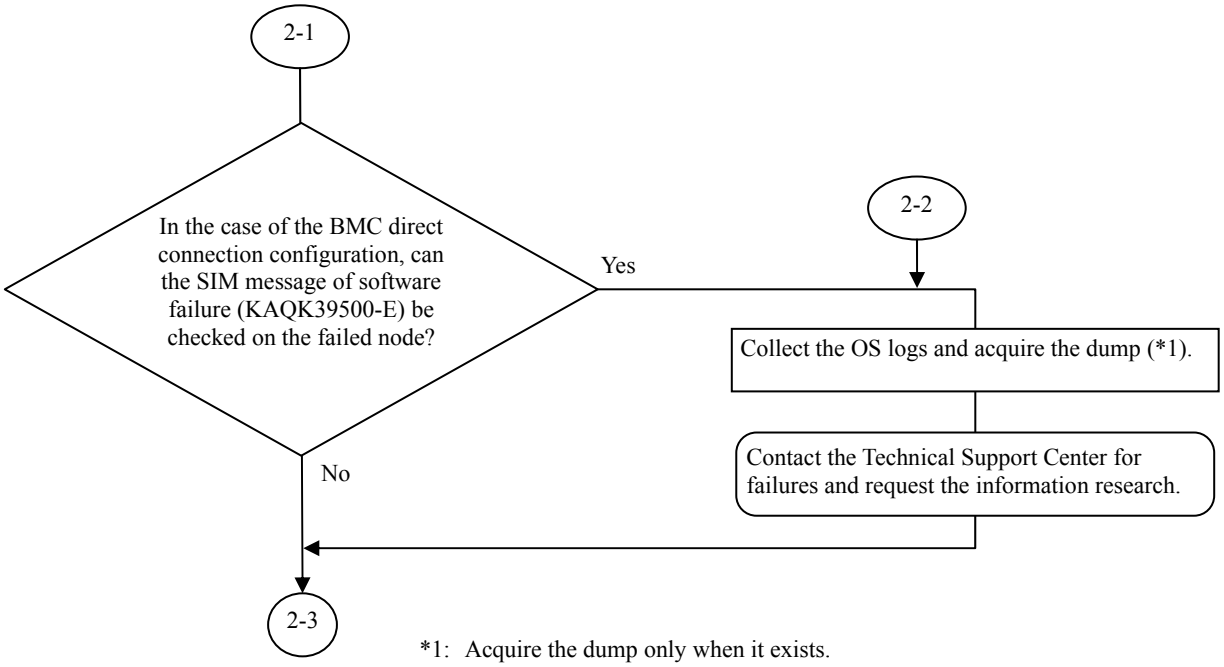

(PSTR 02-0480)

*1: Acquire the dump only when it exists.
For acquiring the log, refer to "Troubleshooting '6.1.1 Acquiring log files' (TRBL 06-0000)".
For acquiring the dump, refer to "Troubleshooting '6.2.1 Collecting dump files' (TRBL 06-0010)".

Figure C.2.3.2.2-2 Flow of Management Network Failure Determination (2/3)

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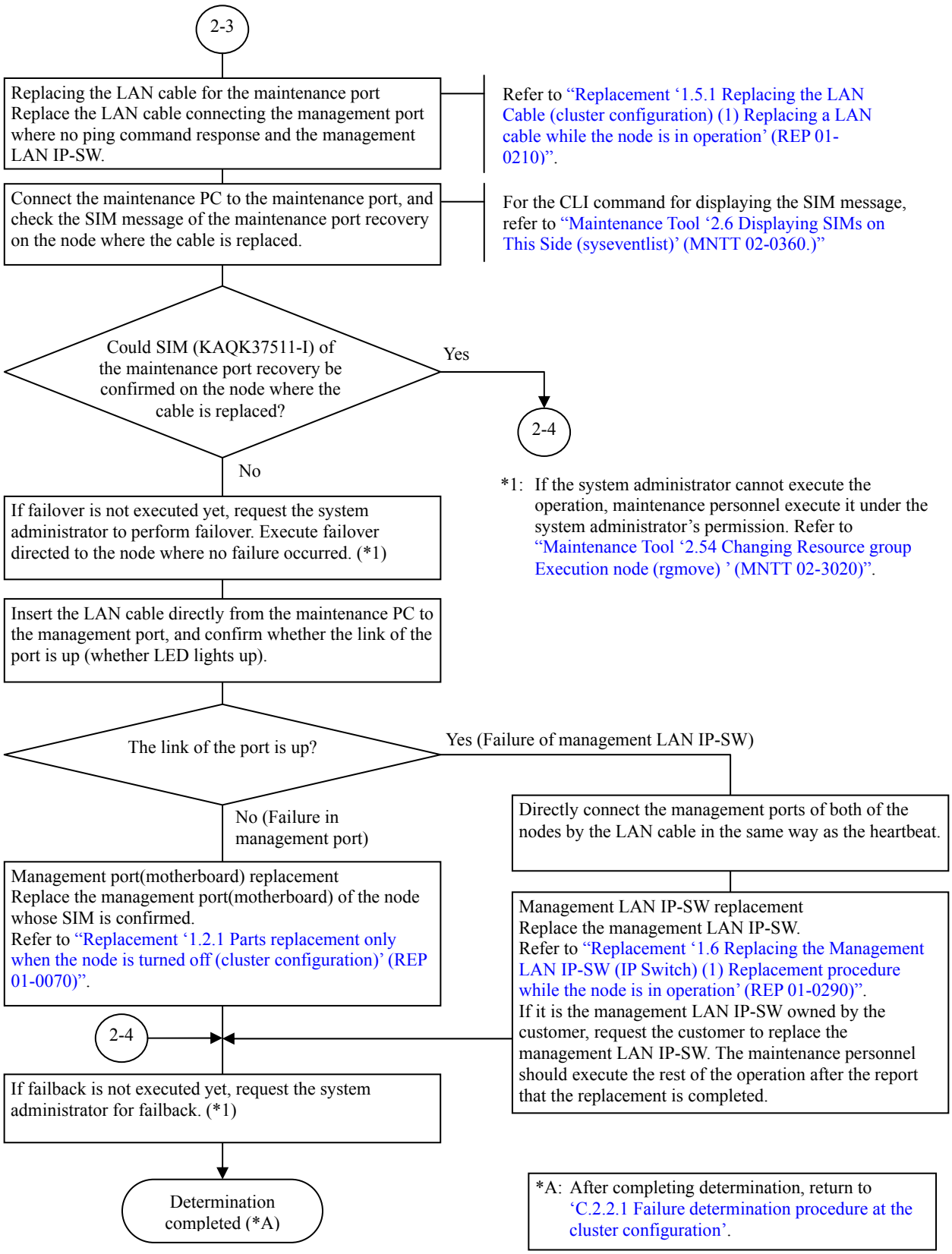

Figure C.2.3.2.2-2 Flow of Management Network Failure Determination (3/3)

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(3) Double failures in the port or cable

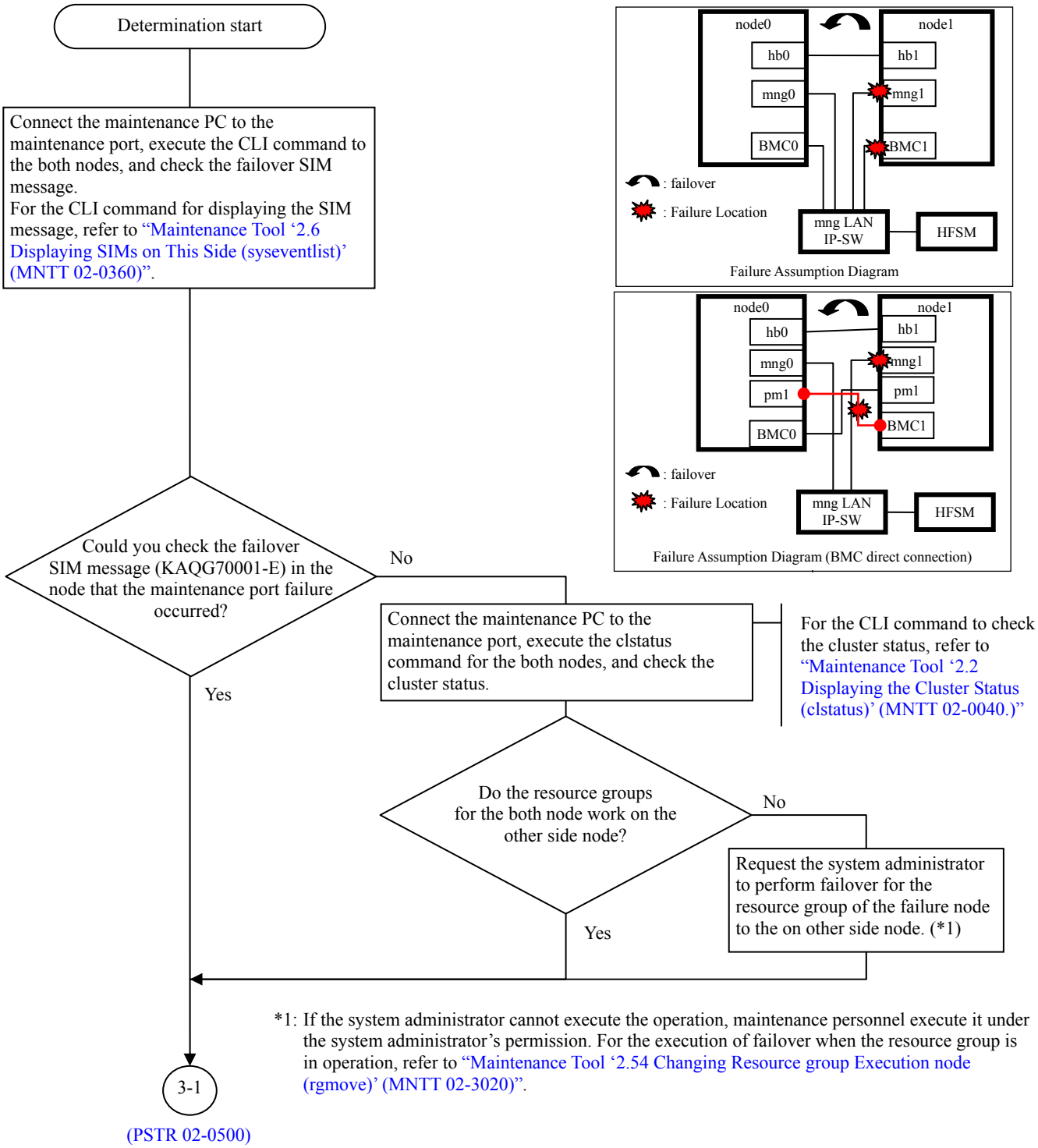

Figure C.2.3.2.2-3 Flow of Management Network Failure Determination (1/6)

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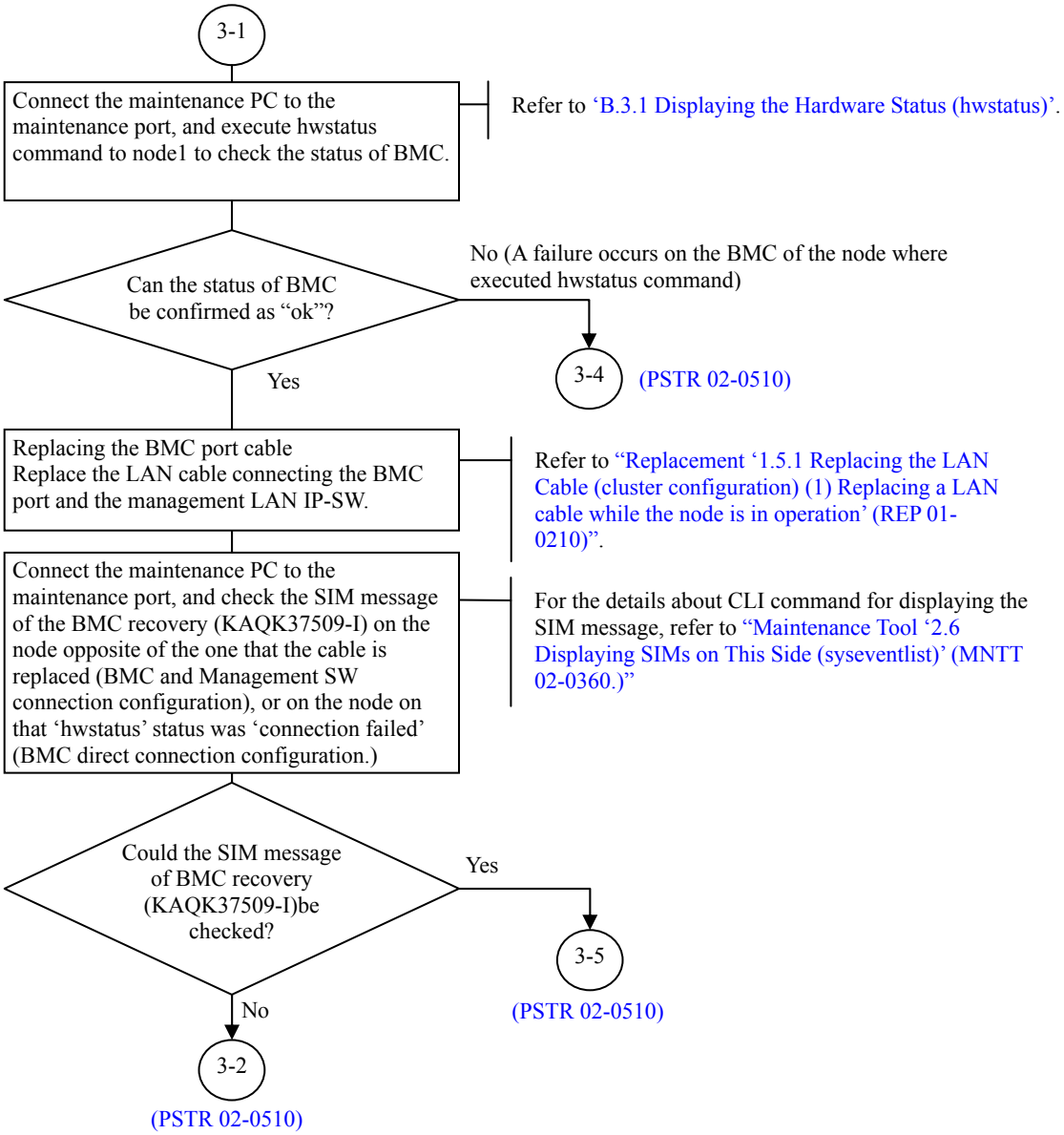

Figure C.2.3.2.2-3 Flow of Management Network Failure Determination (2/6)

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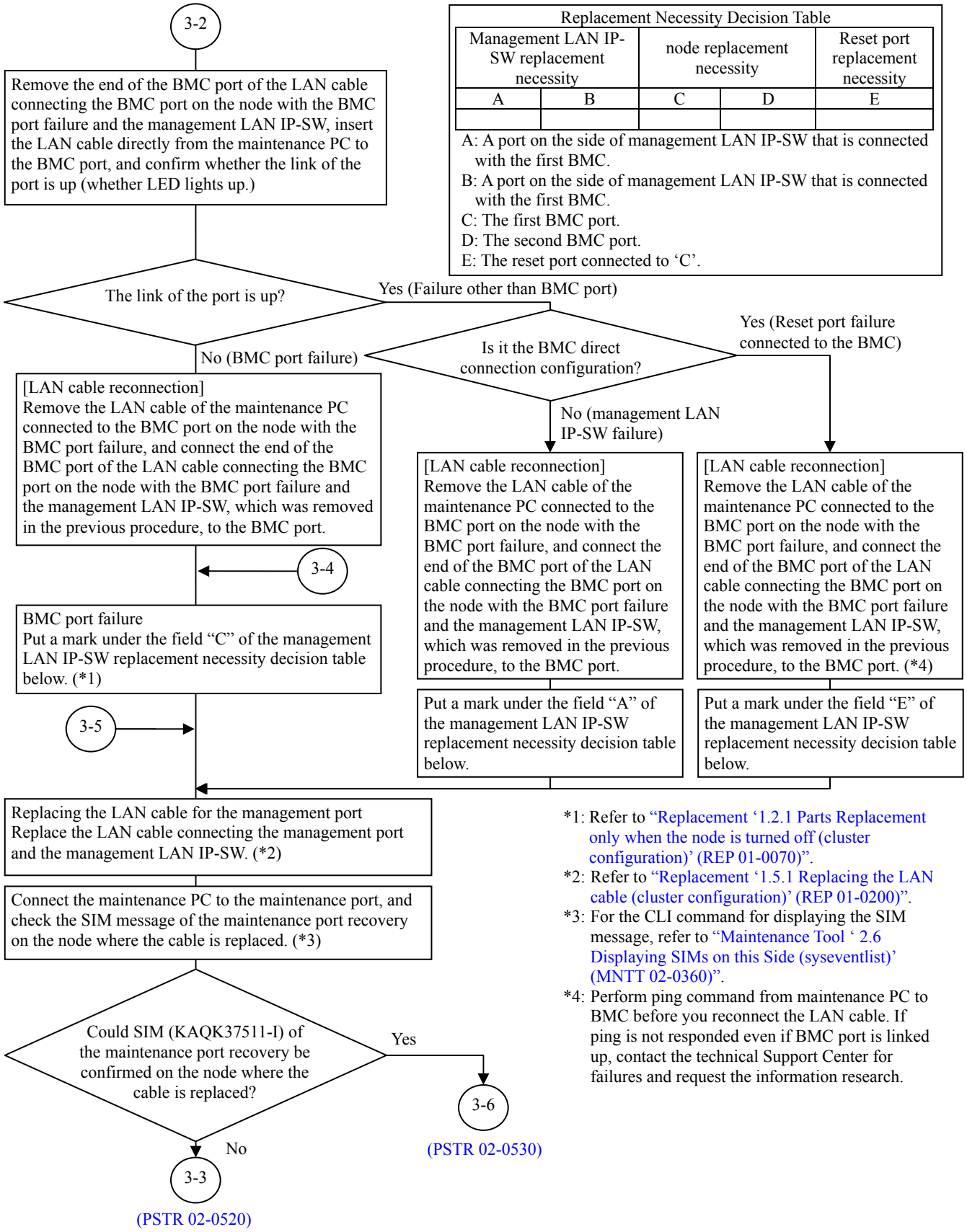

Replacement Necessity Decision Table

Management LAN IP-SW replacement necessity		node replacement necessity		Reset port replacement necessity
A	B	C	D	E

A: A port on the side of management LAN IP-SW that is connected with the first BMC.
B: A port on the side of management LAN IP-SW that is connected with the first BMC.
C: The first BMC port.
D: The second BMC port.
E: The reset port connected to 'C'.

*1: Refer to "Replacement '1.2.1 Parts Replacement only when the node is turned off (cluster configuration)' (REP 01-0070)".
*2: Refer to "Replacement '1.5.1 Replacing the LAN cable (cluster configuration)' (REP 01-0200)".
*3: For the CLI command for displaying the SIM message, refer to "Maintenance Tool ' 2.6 Displaying SIMs on this Side (syseventlist)' (MNTT 02-0360)".
*4: Perform ping command from maintenance PC to BMC before you reconnect the LAN cable. If ping is not responded even if BMC port is linked up, contact the technical Support Center for failures and request the information research.

Figure C.2.3.2.2-3 Flow of Management Network Failure Determination (3/6)

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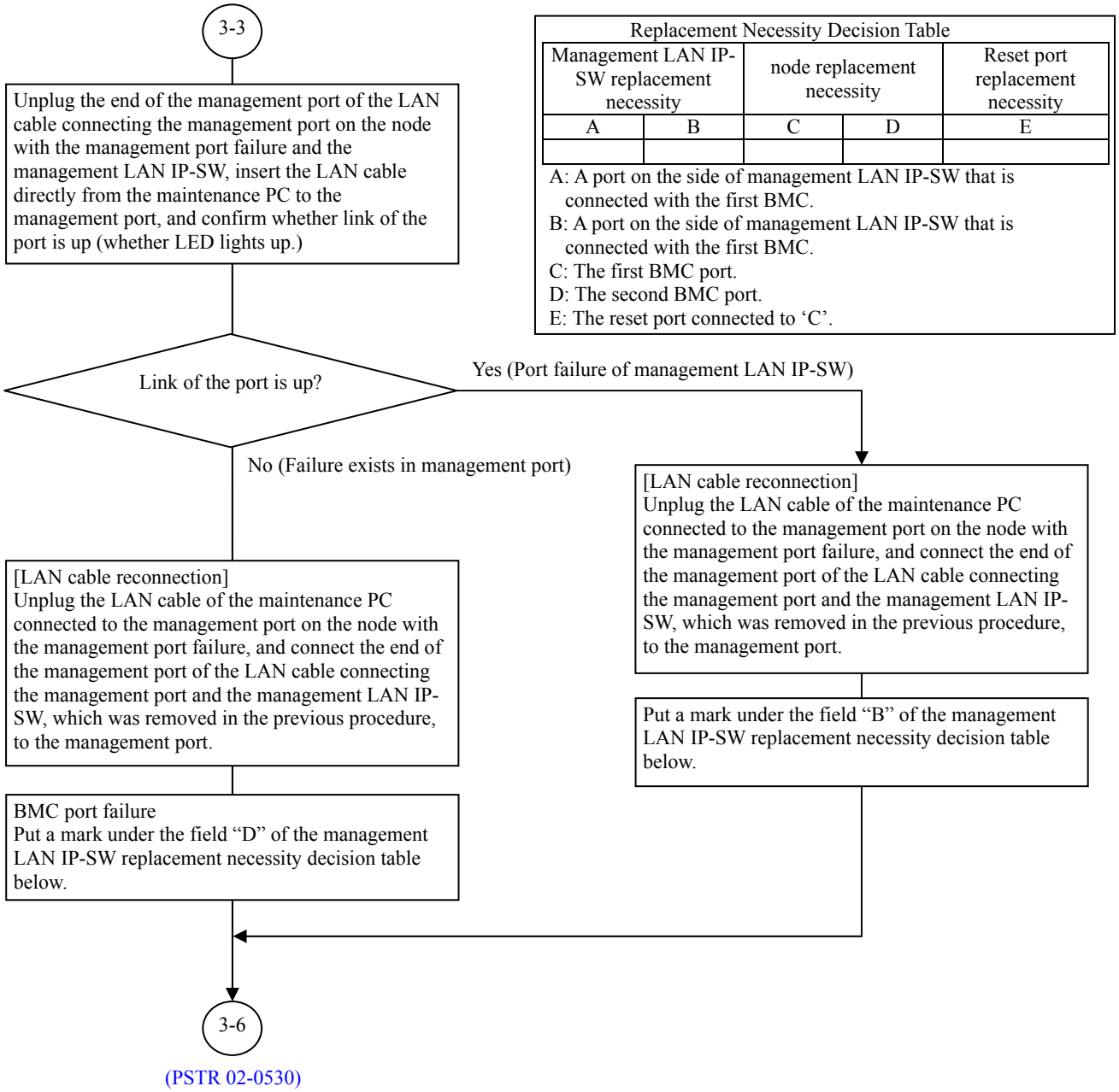

Replacement Necessity Decision Table

Management LAN IP-SW replacement necessity		node replacement necessity		Reset port replacement necessity
A	B	C	D	E

A: A port on the side of management LAN IP-SW that is connected with the first BMC.
B: A port on the side of management LAN IP-SW that is connected with the first BMC.
C: The first BMC port.
D: The second BMC port.
E: The reset port connected to 'C'.

Figure C.2.3.2.2-3 Flow of Management Network Failure Determination (4/6)

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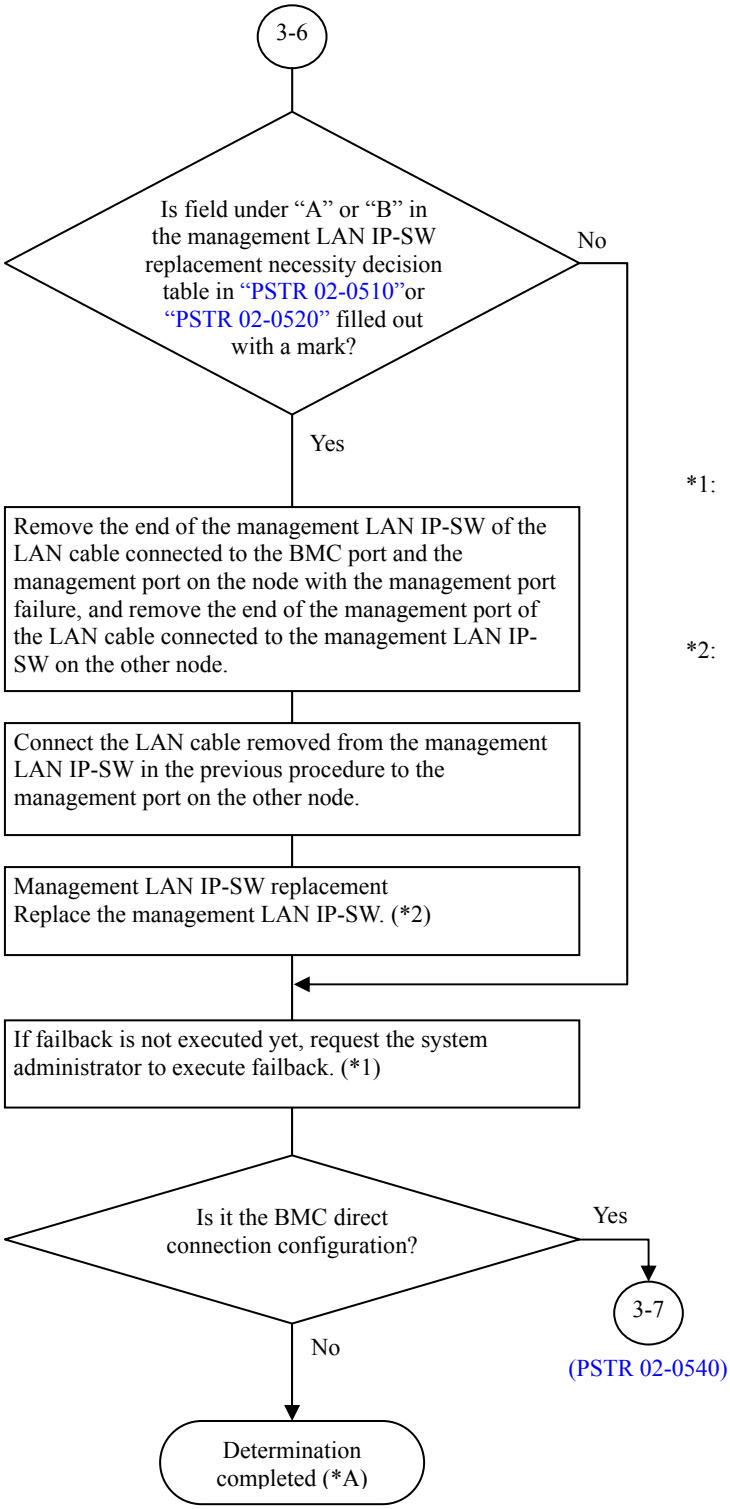

*1: If the system administrator cannot execute the operation, maintenance personnel execute it under the system administrator's permission. For the execution of failover when the resource group is in operation, refer to "Maintenance Tool '2.54 Changing Resource group Execution node (rgmove)' (MNTT 02-3020)".

*2: Refer to "Replacement '1.6 Replacing the Management LAN IP-SW (IP Switch) (1) Replacement procedure while the node is in operation' (REP 01-0290)".
If it is the management LAN IP-SW owned by the customer, request the customer to replace the management LAN IP-SW. The maintenance personnel should execute the rest of the operation after the report that the replacement is completed.

*A: After completing determination, return to 'C.2.2.1 Failure determination procedure at the cluster configuration'.

Figure C.2.3.2.2-3 Flow of Management Network Failure Determination (5/6)

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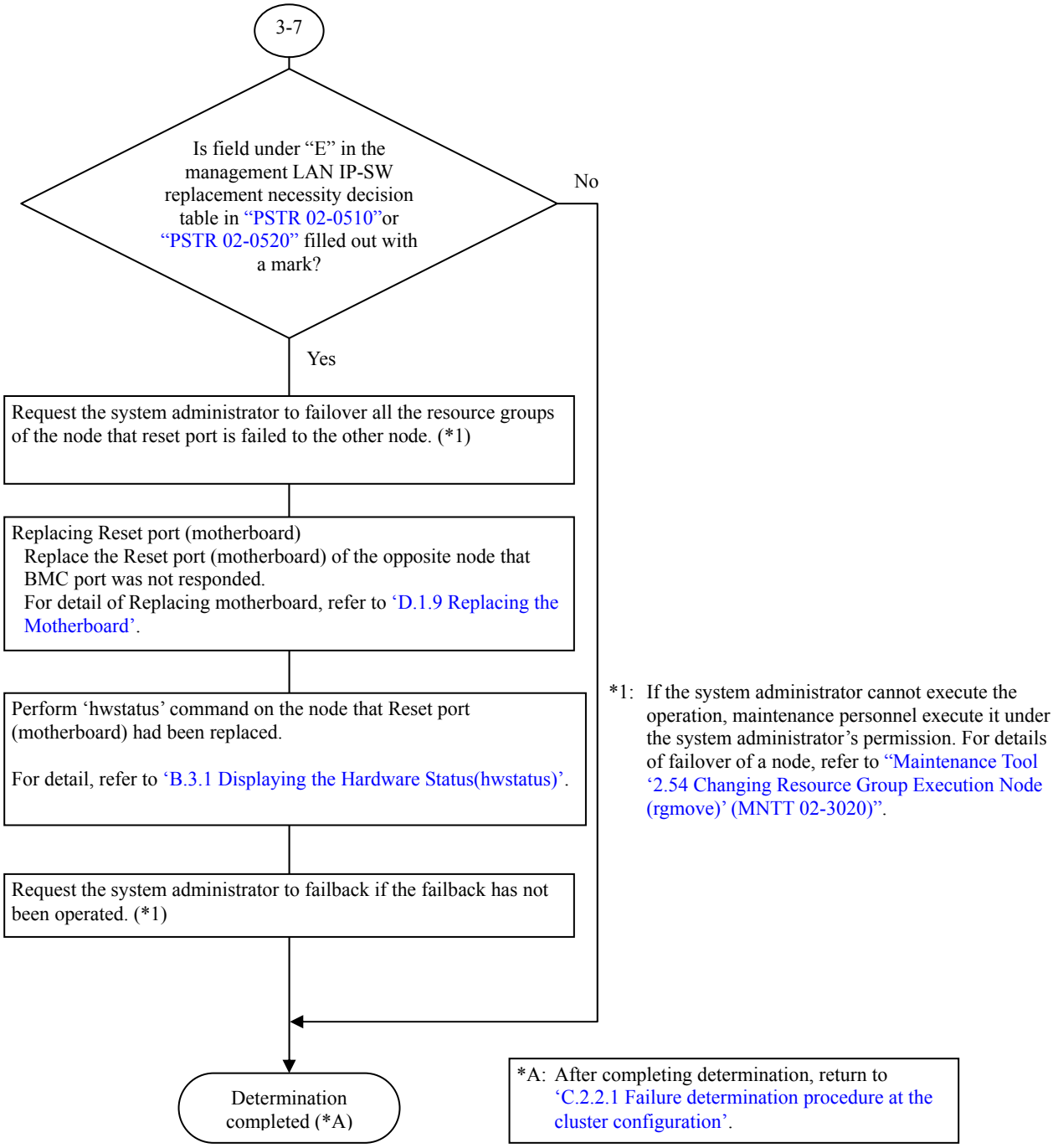

Figure C.2.3.2.2-3 Flow of Management Network Failure Determination (6/6)

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(4) OS down and the failure in the BMC port on the same node

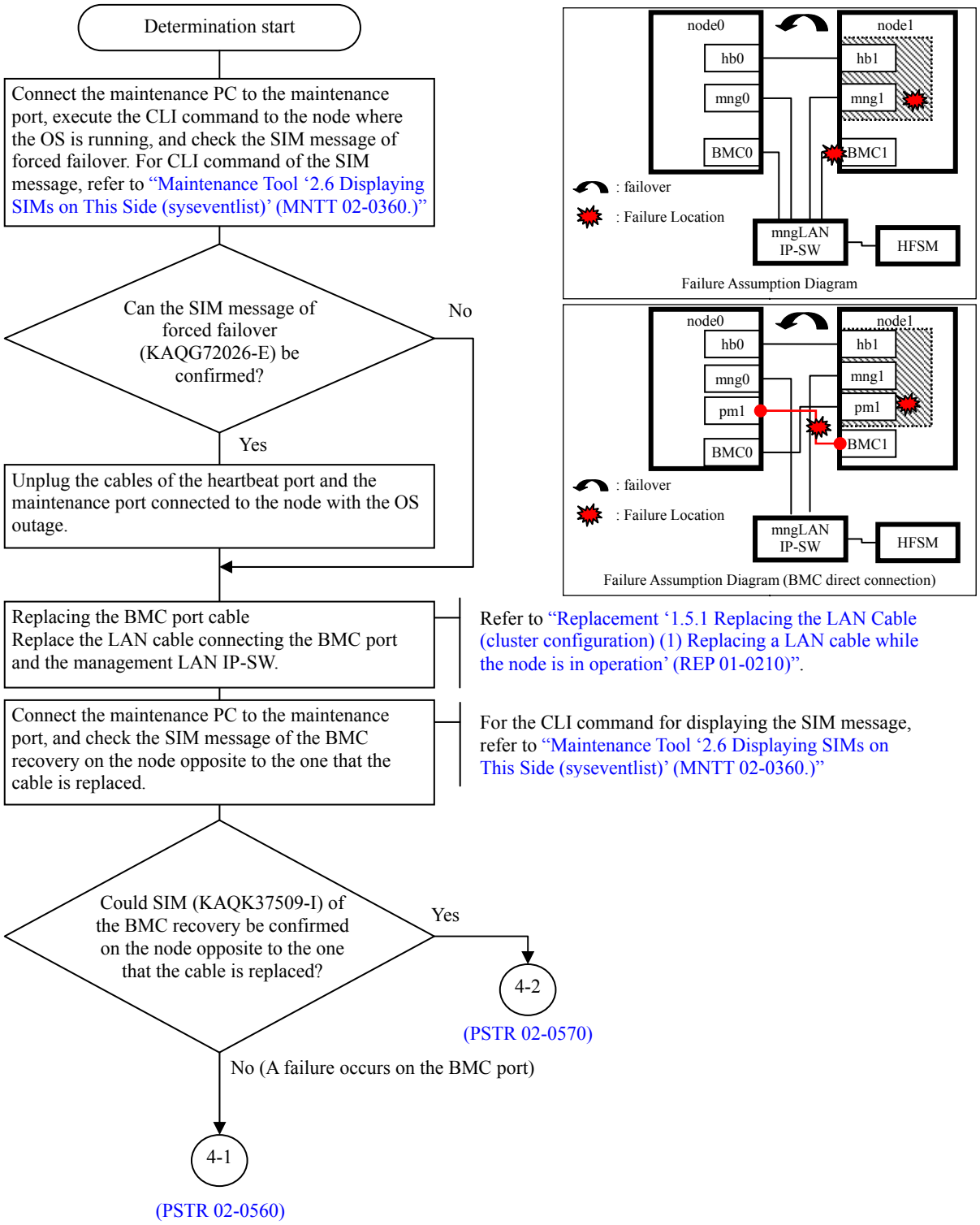

Figure C.2.3.2.2-4 Flow of Management Network Failure Determination (1/7)

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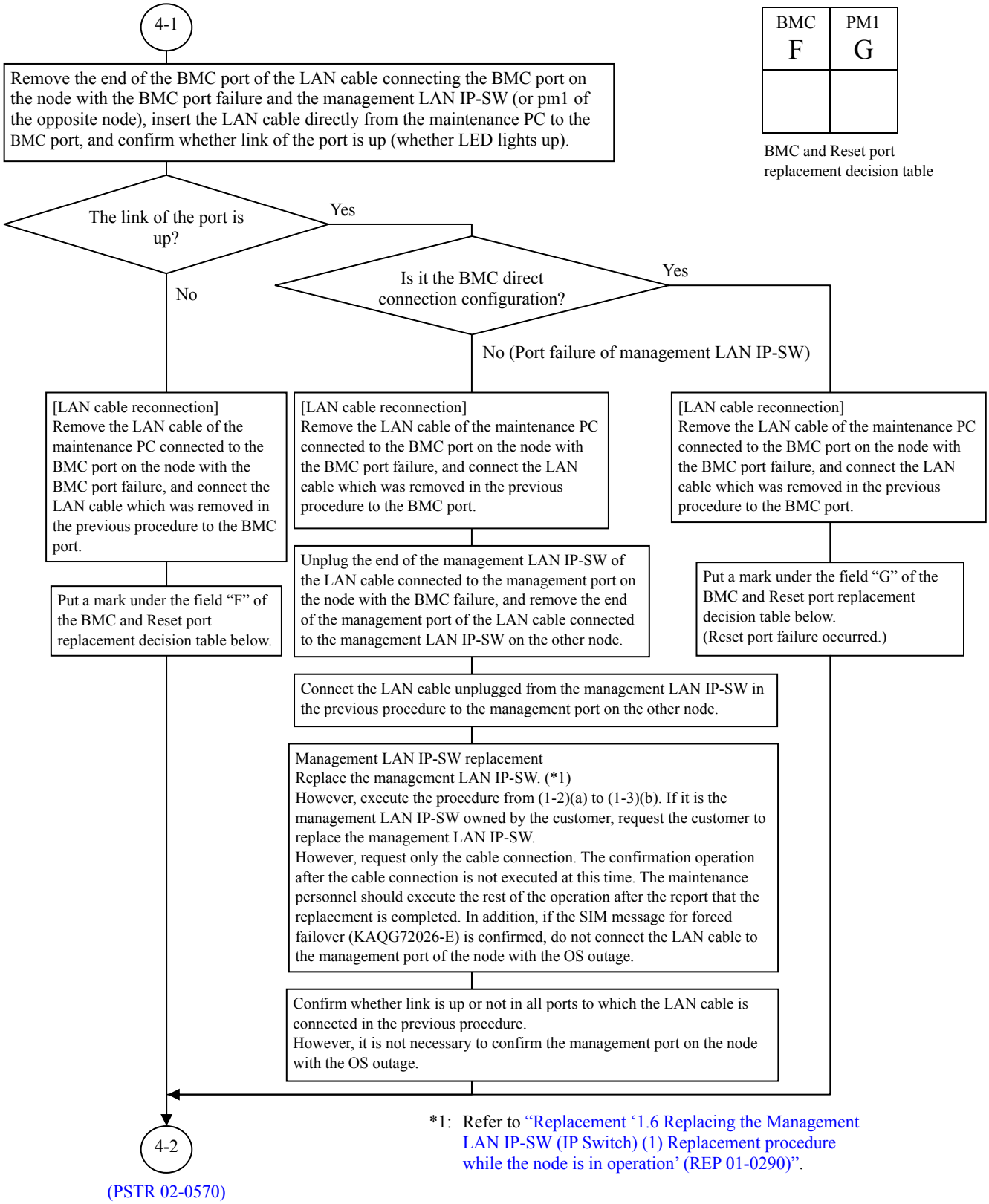

Figure C.2.3.2.2-4 Flow of Management Network Failure Determination (2/7)

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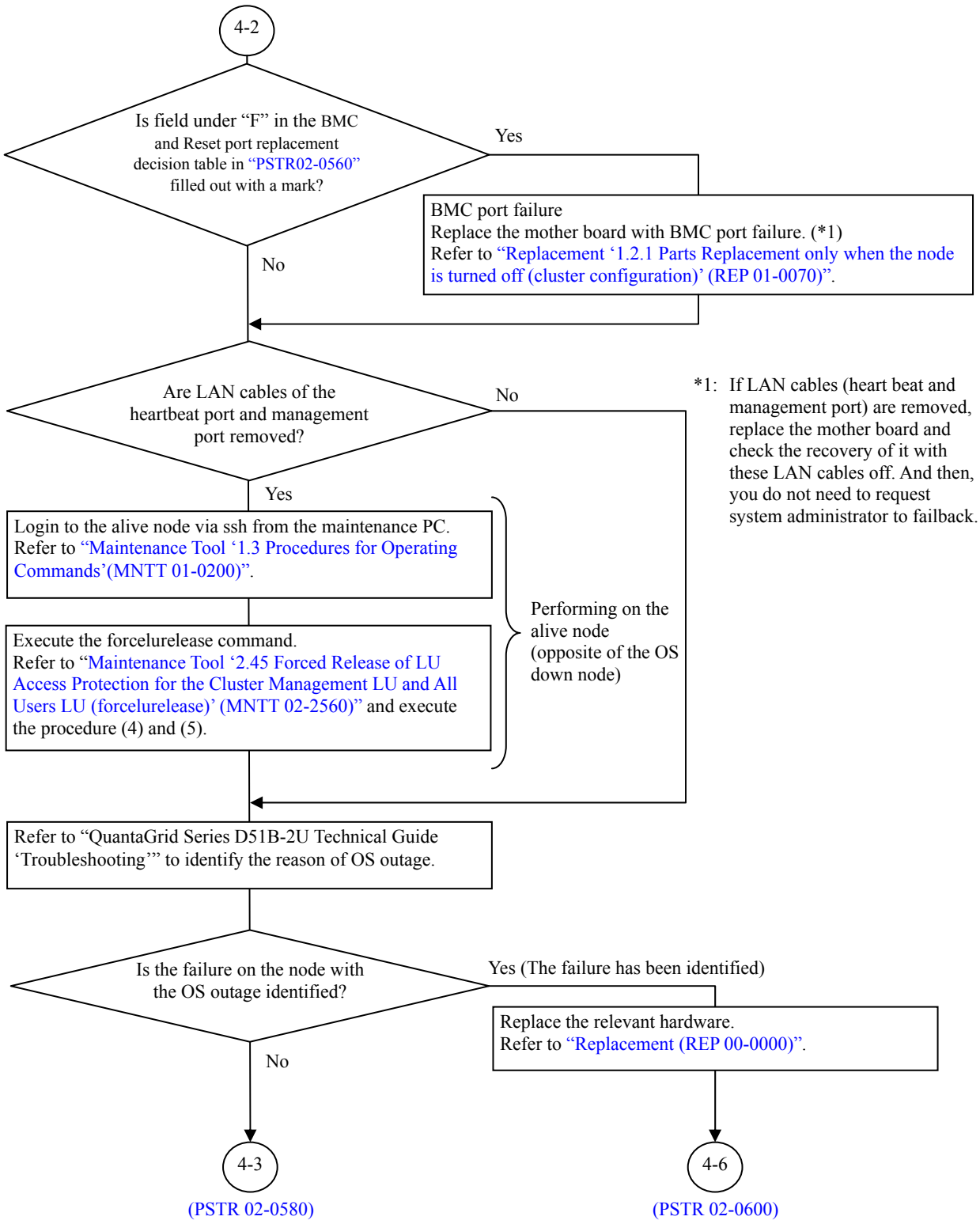

Figure C.2.3.2.2-4 Flow of Management Network Failure Determination (3/7)

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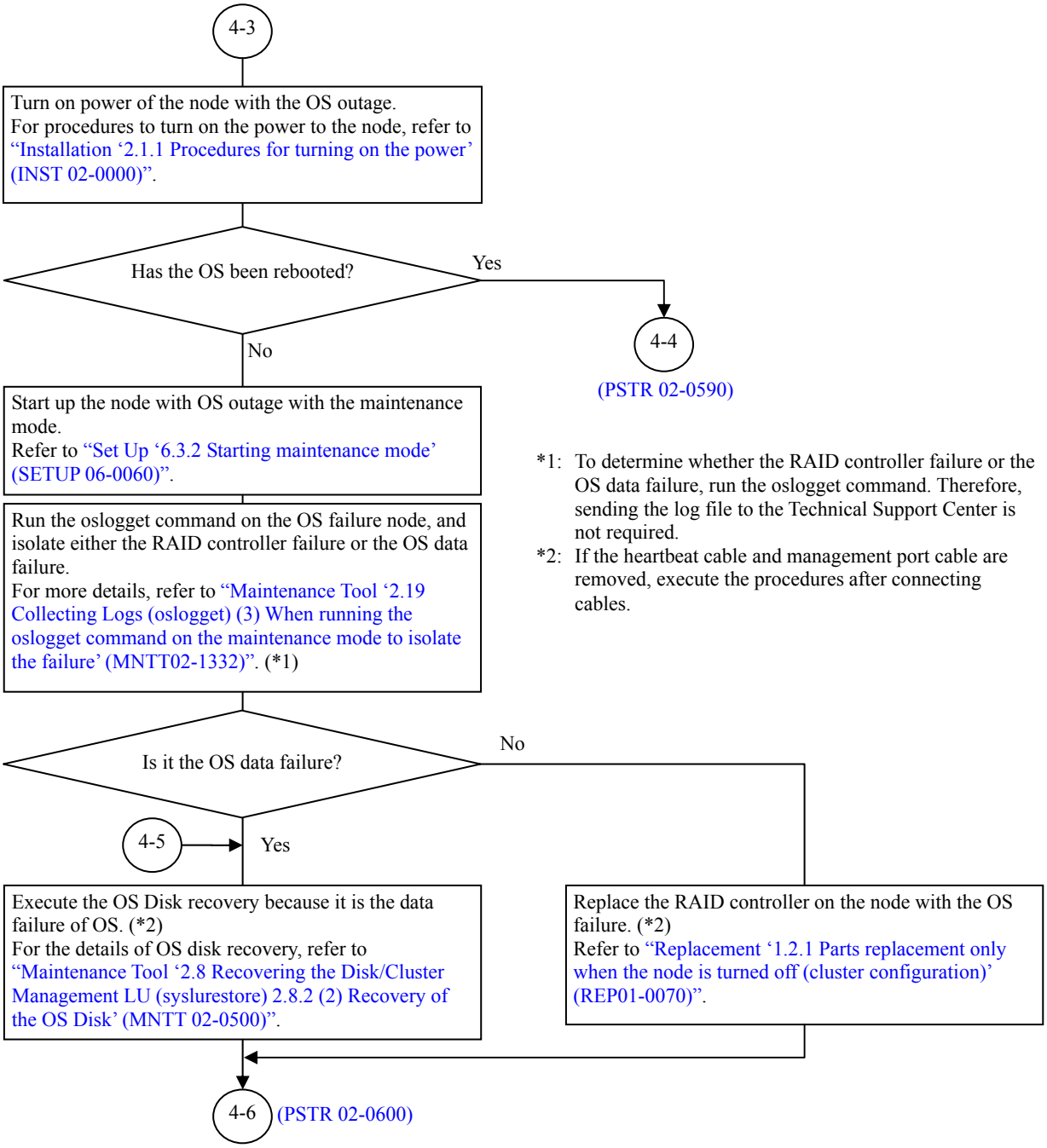

Figure C.2.3.2.2-4 Flow of Management Network Failure Determination (4/7)

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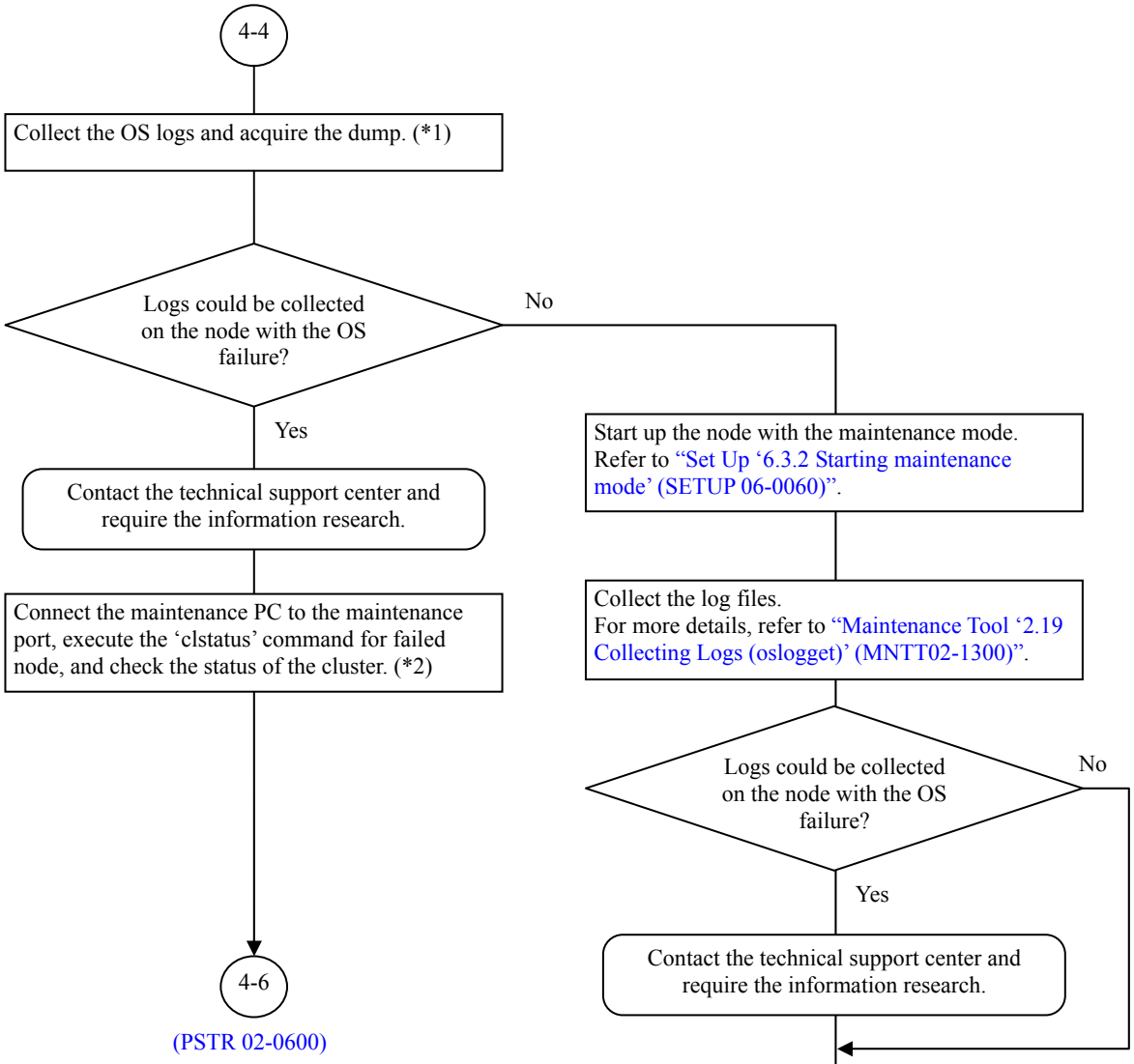

*1: Acquire the dump only when it exists.
For acquiring the log, refer to "Troubleshooting '6.1.1 Acquiring log files' (TRBL 06-0000)".
For acquiring the dump, refer to "Troubleshooting '6.2.1 Collecting dump files' (TRBL 06-0010)".

*2: Refer to "Maintenance Tool '2.2 Displaying the Cluster Status(clstatus)' (MNTT 02-0040)".

Figure C.2.3.2.2-4 Flow of Management Network Failure Determination (5/7)

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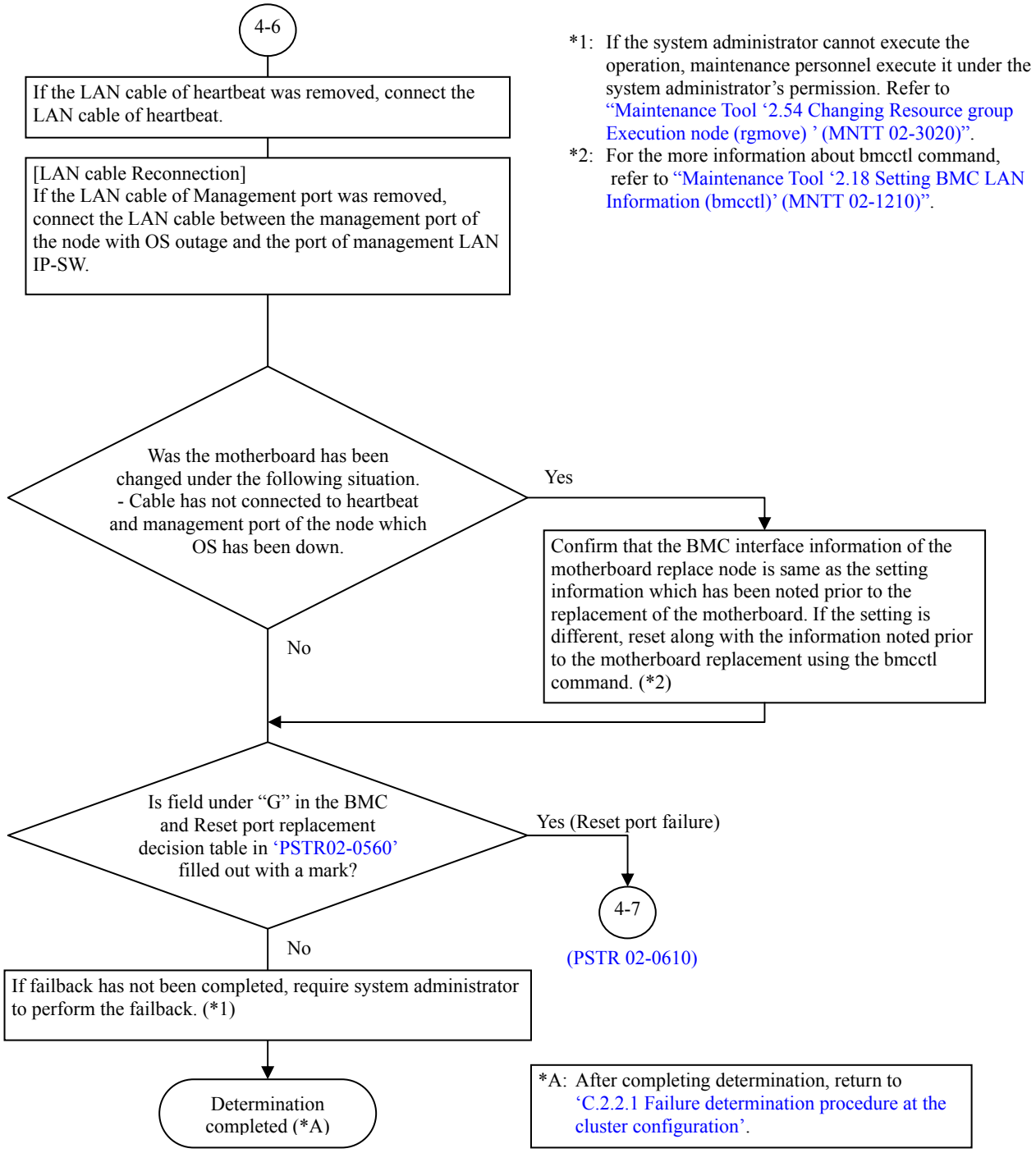

Figure C.2.3.2.2-4 Flow of Management Network Failure Determination (6/7)

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4-7

Require the system administrator to failover all the resource groups of the node that reset port is failed to the other node. (*1)

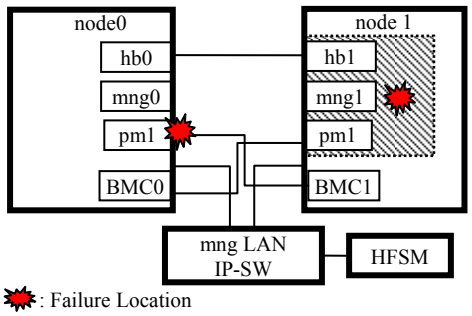
Turn off the power of the node that reset port(motherboard) will be replaced. (*2)

[Replacing Reset port (motherboard)]
Replace the Reset port (motherboard) of the opposite node that BMC port was not responded.
For detail of Replacing motherboard, refer to 'D.1.9 Replacing the Motherboard'.

Turn on power of the node.
For procedures to turn on the power to the node, refer to "Installation '2.1.1 Procedure for turning on the power' (INST 02-0000.)"

If failback has not been completed, require system administrator to perform the failback. (*1)

Determination completed (*A)



Failure Assumption Diagram

*1: If the system administrator cannot execute the operation, maintenance personnel execute it under the system administrator's permission. For details of failover of a node, refer to "Maintenance Tool '2.54 Changing Resource Group Execution Node (rgmove)' (MNTT 02-3020)".

*2: Perform "nasshutdown --force". For more detail, refer to "Maintenance Tool '2.28 Terminating the OS of This side node (nasshutdown)' (MNTT 02-1740.)"

*A: After completing determination, return to 'C.2.2.1 Failure determination procedure at the cluster configuration'.

z

Figure C.2.3.2.2-4 Flow of Management Network Failure Determination (7/7)

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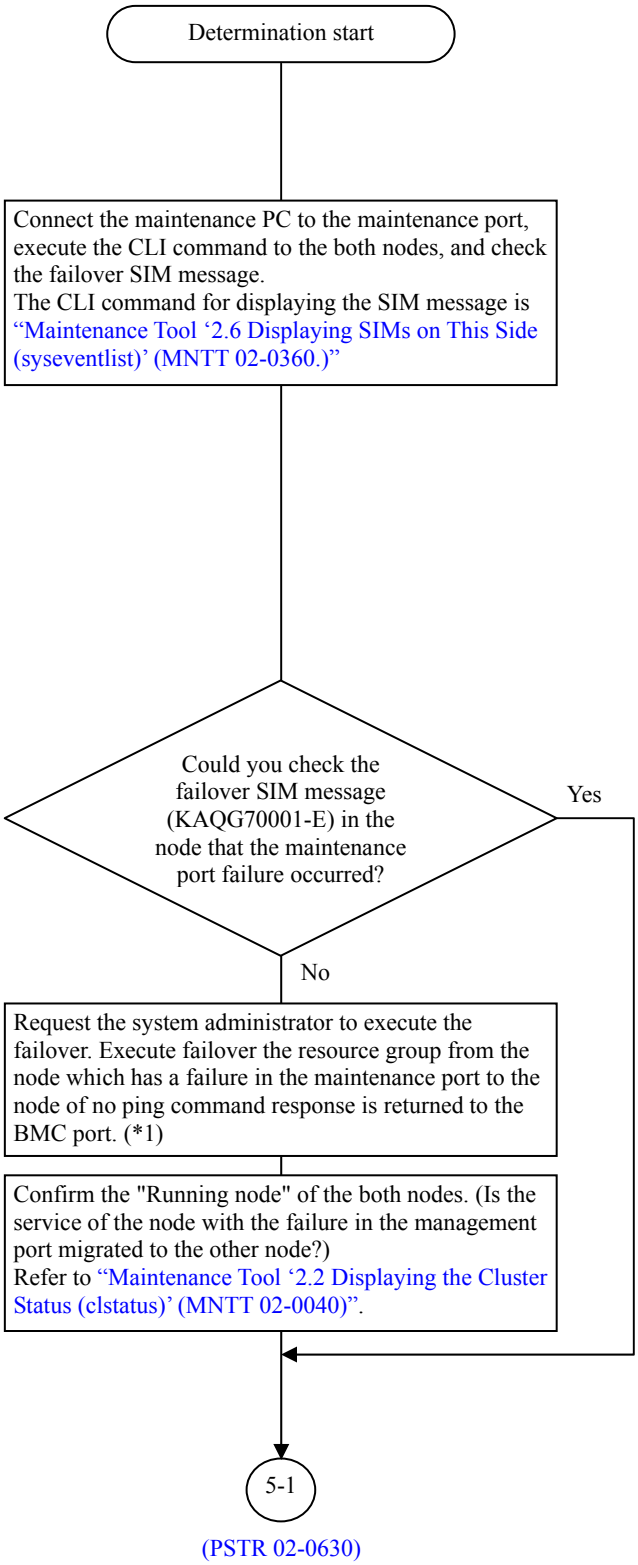
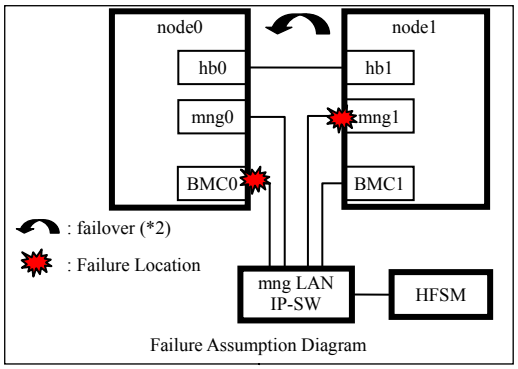
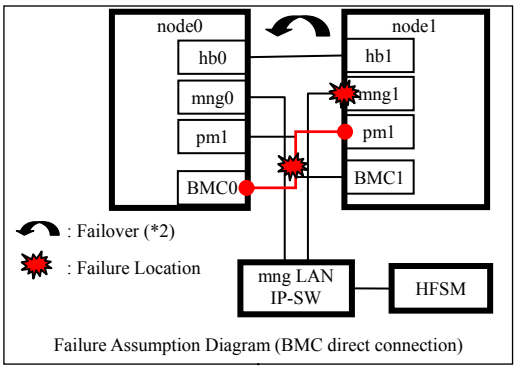
(5) Failure in the BMC port and in the management port of the other node





Failure Assumption Diagram



Failure Assumption Diagram (BMC direct connection)

*1: If the system administrator cannot execute the operation, maintenance personnel execute it under the system administrator's permission. For the execution of failover when the resource group is in operation, refer to "Maintenance Tool '2.54 Changing Resource group Execution node (rgmove)' (MNTT 02-3020)".

2: In the case the management port does not have service IP addresses, failover will not occur.

Figure C.2.3.2.2-5 Flow of Management Network Failure Determination (1/6)

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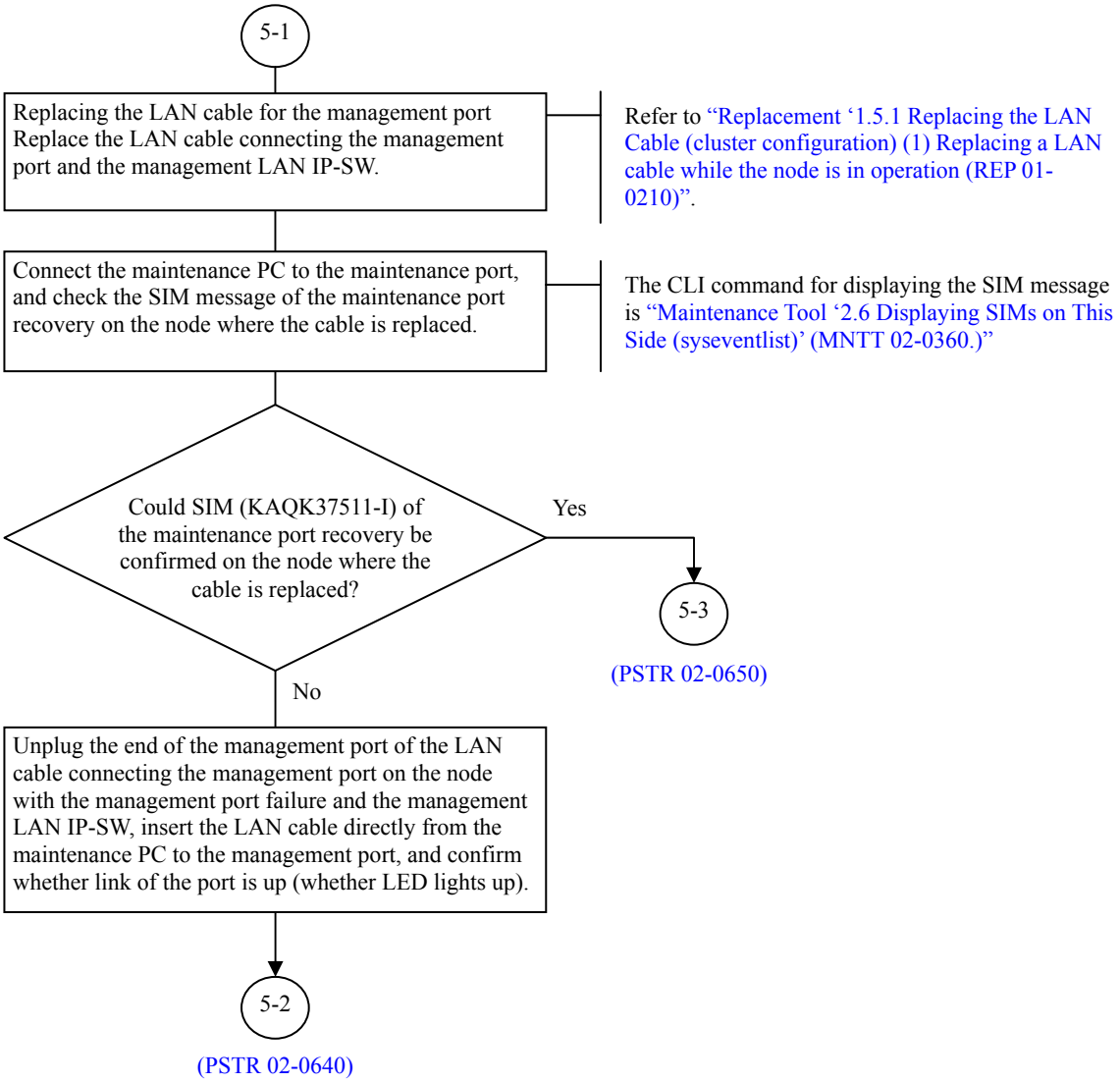

Figure C.2.3.2.2-5 Flow of Management Network Failure Determination (2/6)

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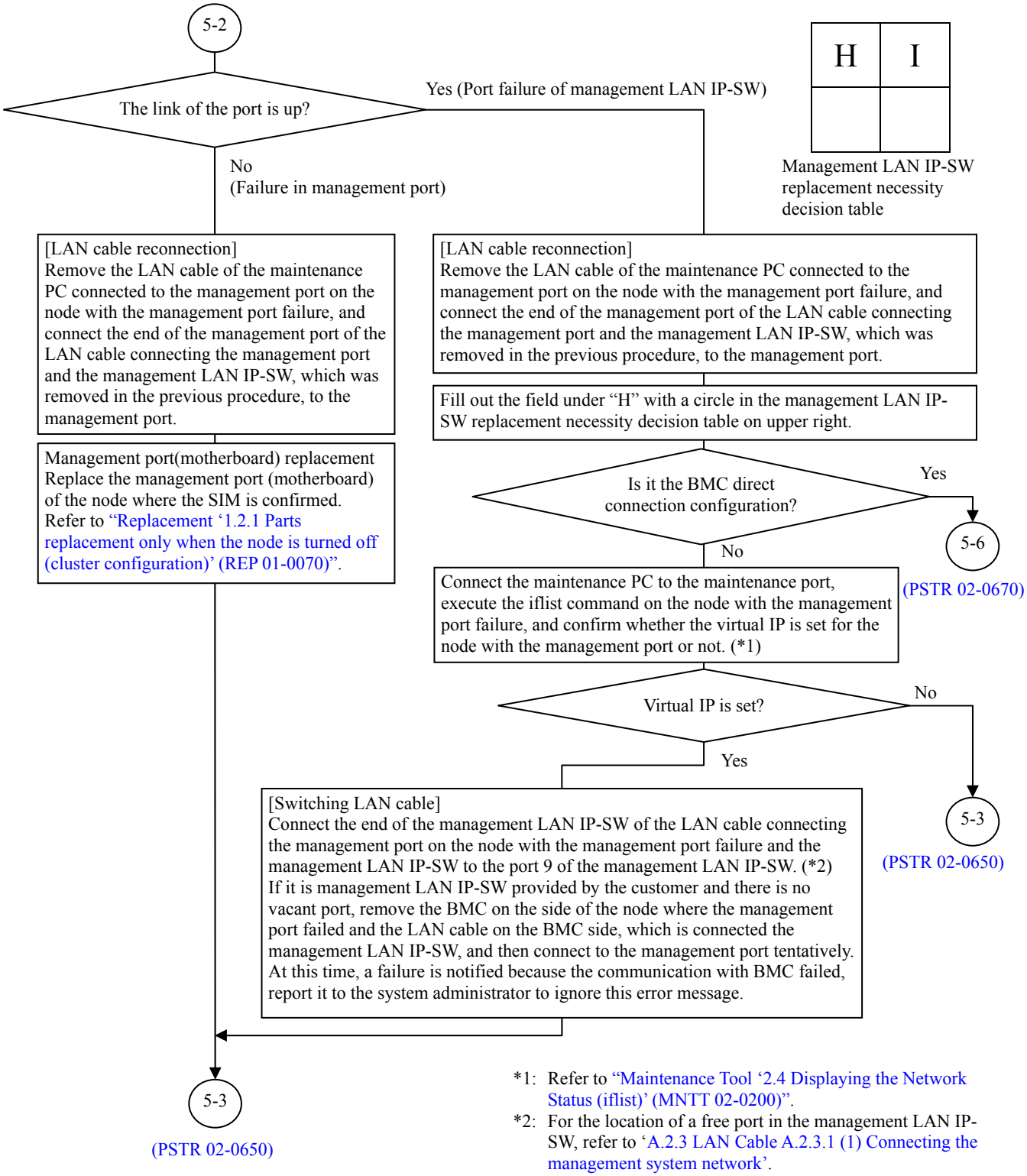

Figure C.2.3.2.2-5 Flow of Management Network Failure Determination (3/6)

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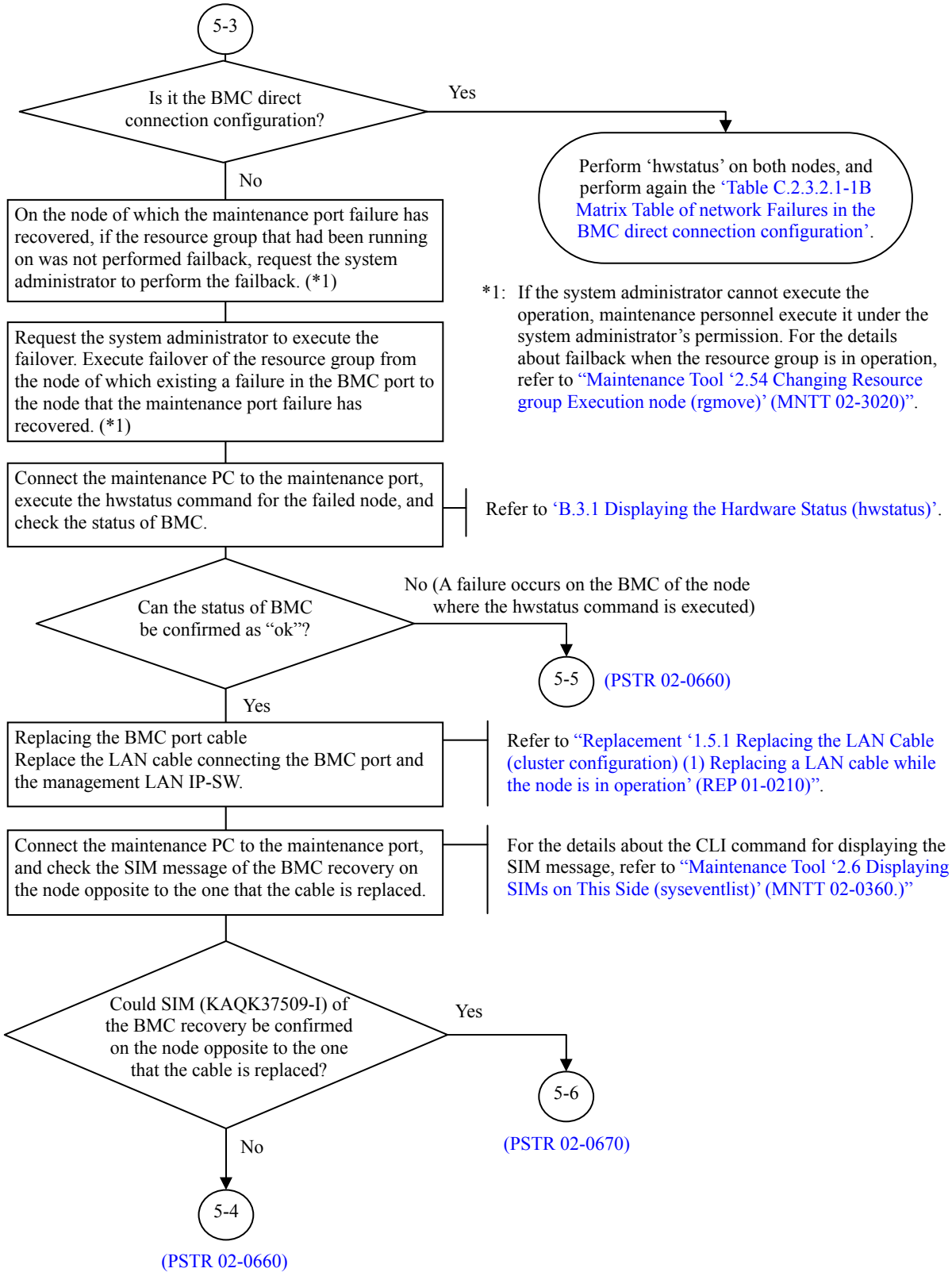

Figure C.2.3.2.2-5 Flow of Management Network Failure Determination (4/6)

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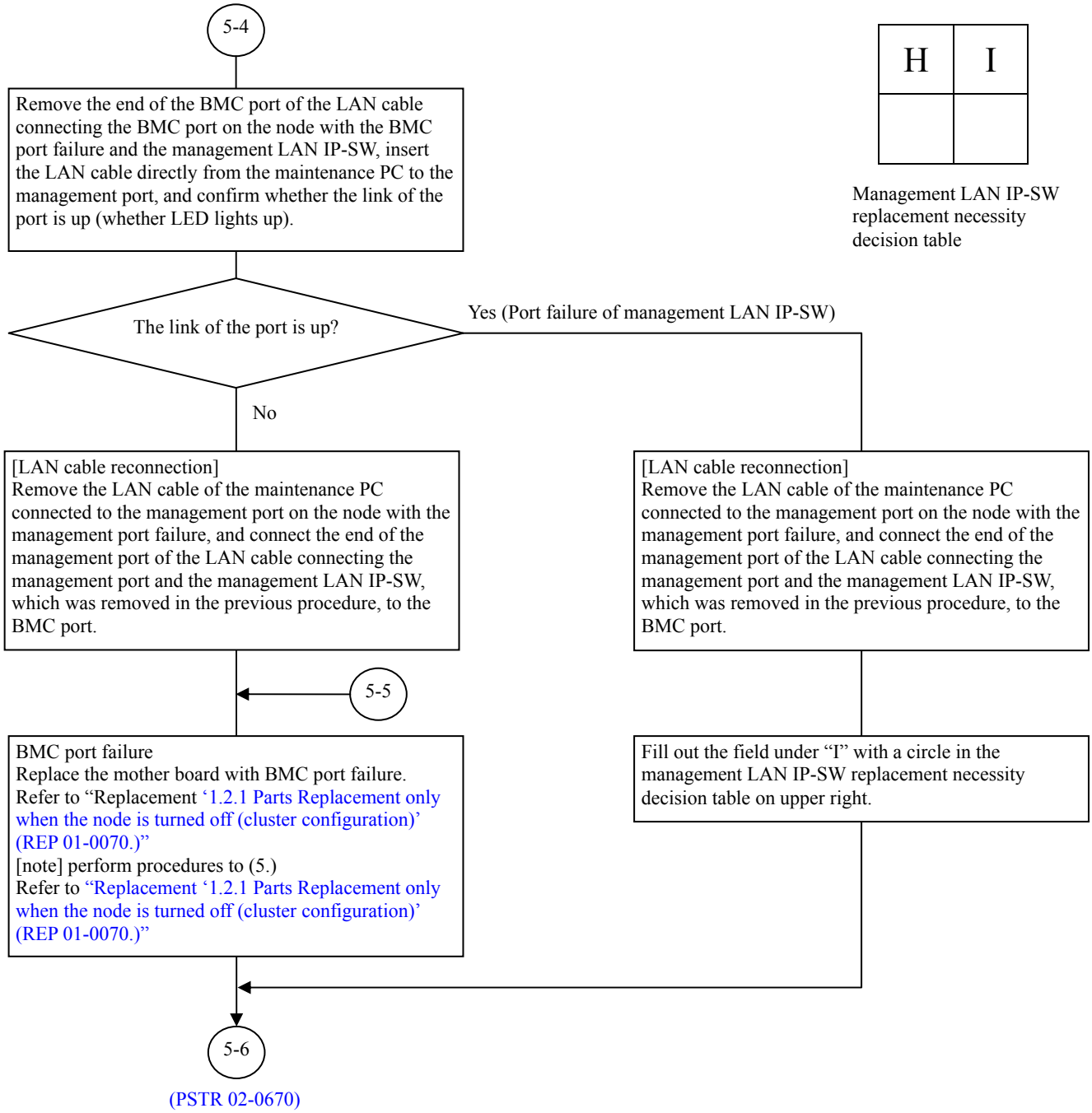

Figure C.2.3.2.2-5 Flow of Management Network Failure Determination (5/6)

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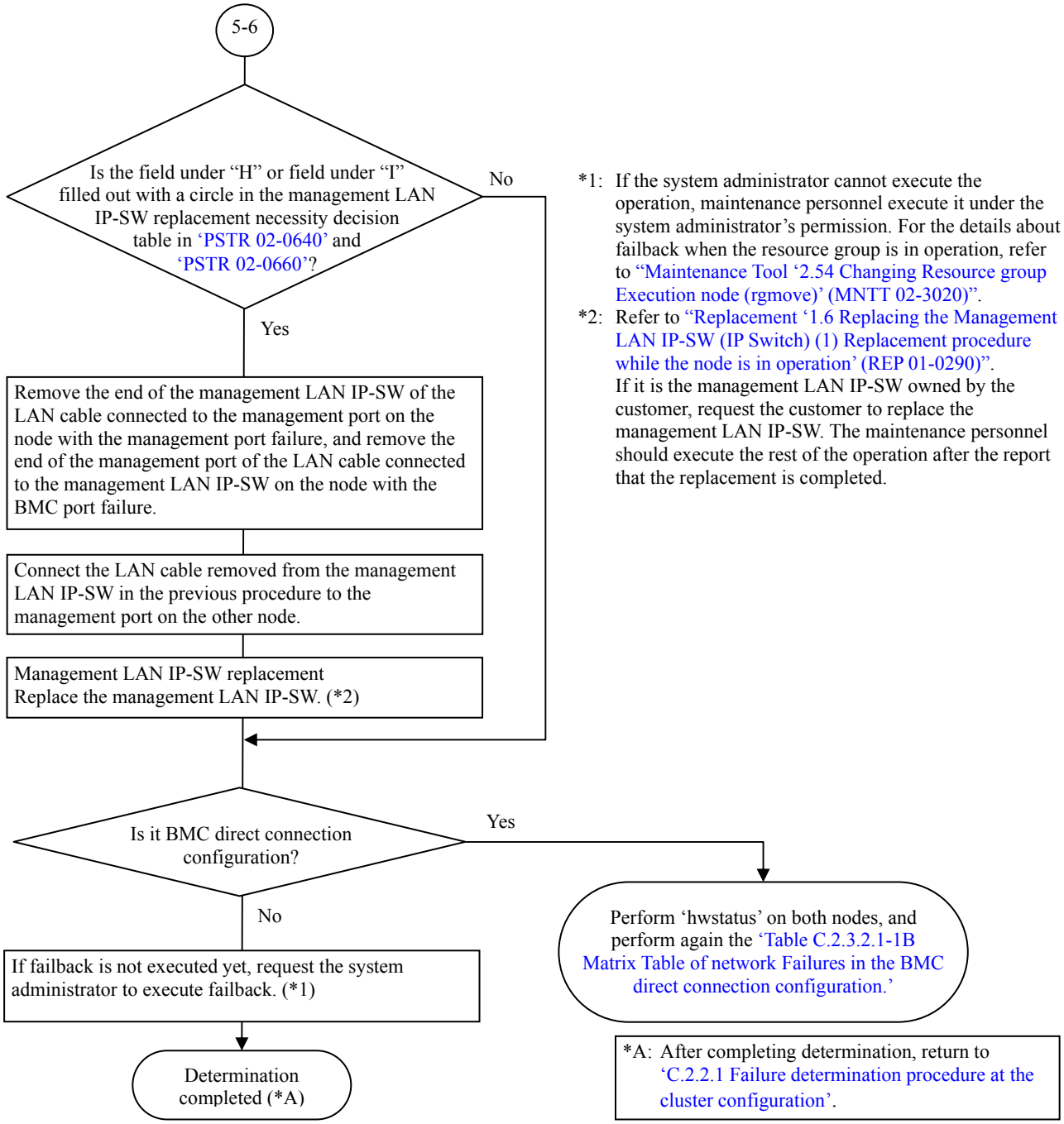

*1: If the system administrator cannot execute the operation, maintenance personnel execute it under the system administrator's permission. For the details about failback when the resource group is in operation, refer to "Maintenance Tool '2.54 Changing Resource group Execution node (rgmove)' (MNTT 02-3020)".

*2: Refer to "Replacement '1.6 Replacing the Management LAN IP-SW (IP Switch) (1) Replacement procedure while the node is in operation' (REP 01-0290)".
If it is the management LAN IP-SW owned by the customer, request the customer to replace the management LAN IP-SW. The maintenance personnel should execute the rest of the operation after the report that the replacement is completed.

Figure C.2.3.2.2-5 Flow of Management Network Failure Determination (6/6)

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(6) OS down and a failure in the BMC port of the other node

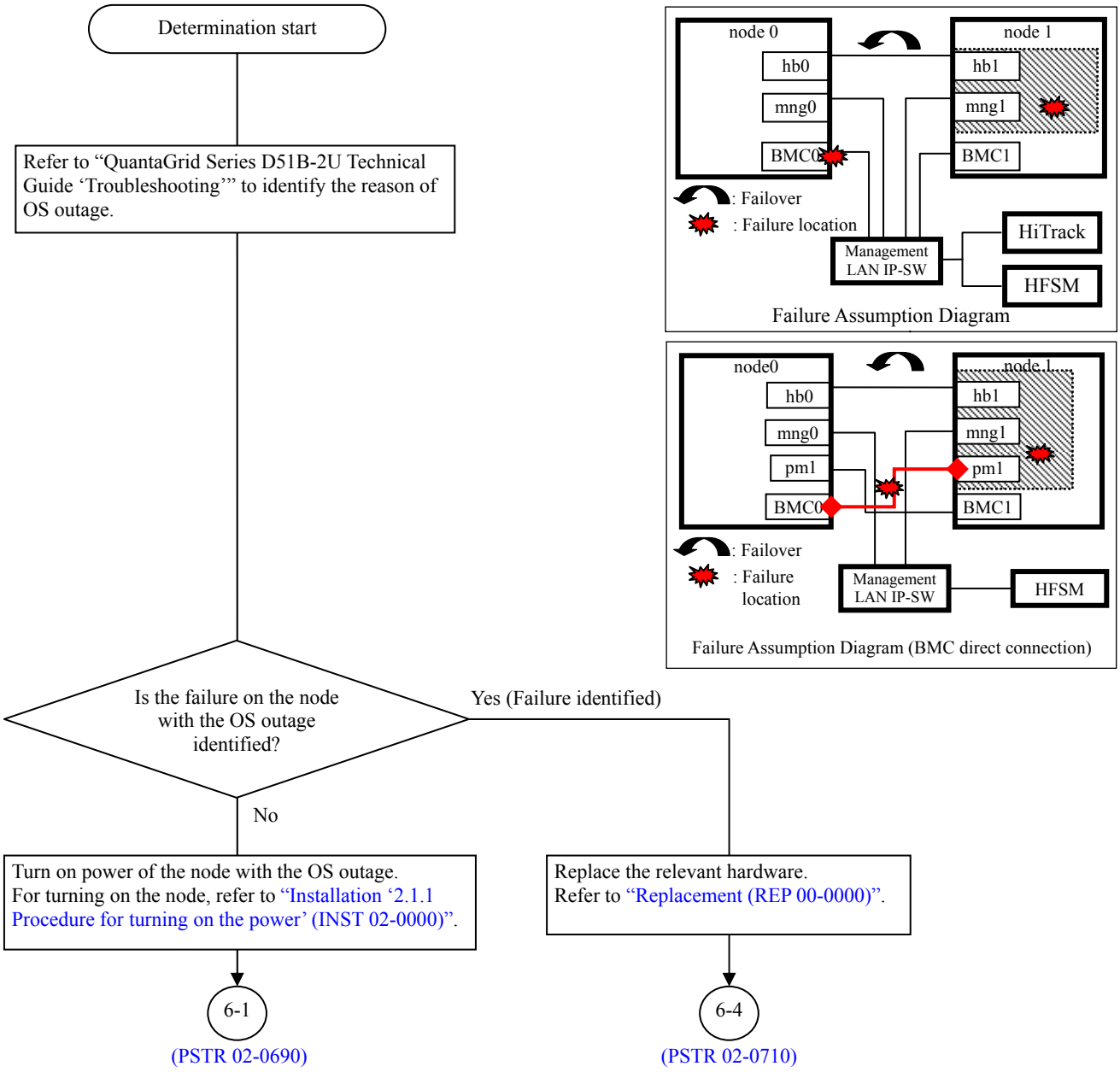

Figure C.2.3.2.2-6 Flow of Management Network Failure Determination (1/6)

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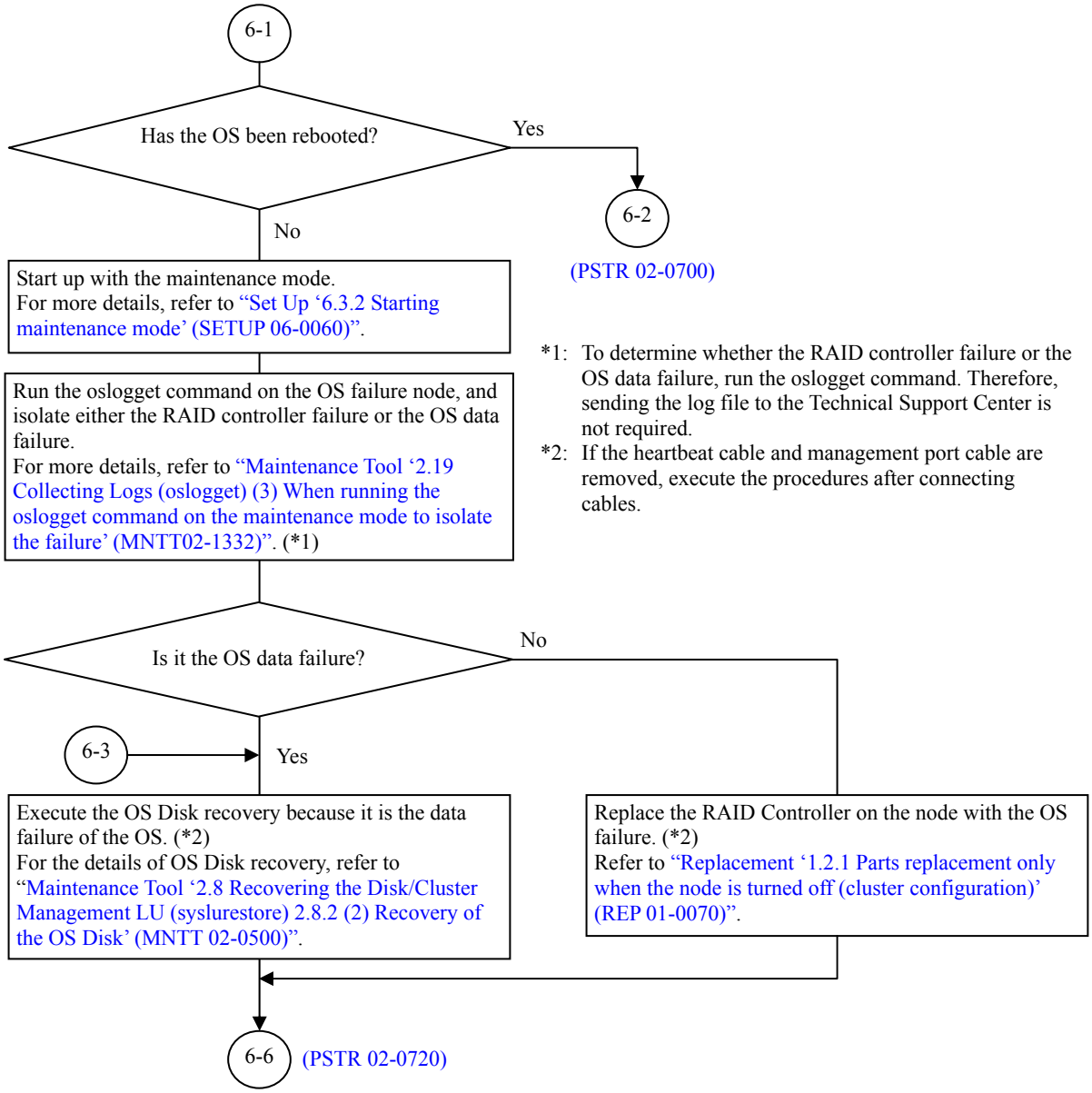

Figure C.2.3.2.2-6 Flow of Management Network Failure Determination (2/6)

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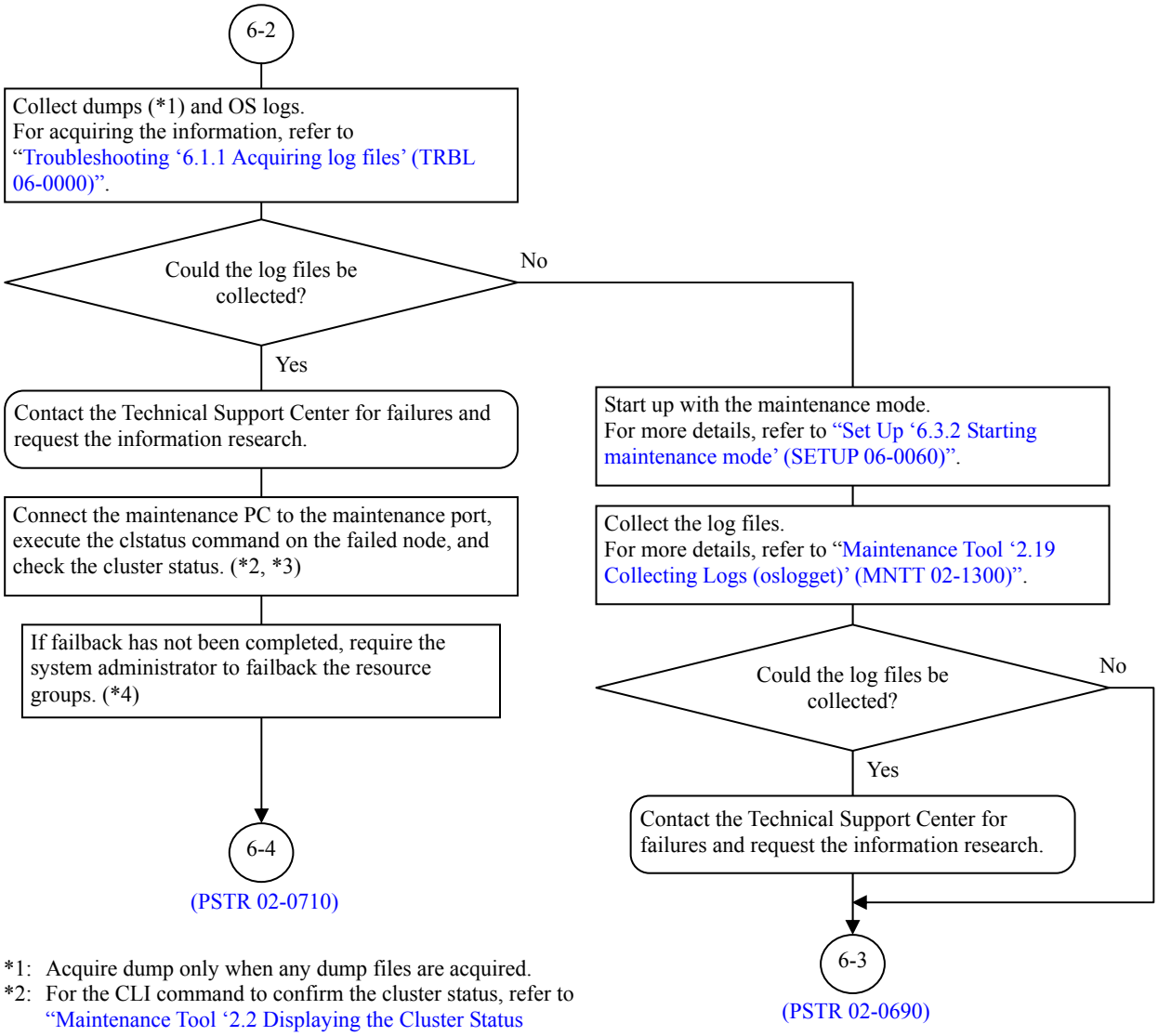

*1: Acquire dump only when any dump files are acquired.
*2: For the CLI command to confirm the cluster status, refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)".
*3: In this case, we cannot identify the reason of OS outage, but we continue to identify the other failure.
*4: If the system administrator cannot execute the operation, maintenance personnel execute it under the system administrator's permission. For details of failover of a node, refer to "Maintenance Tool '2.54 Changing Resource Group Execution Node (rgmove)' (MNTT 02-3020)".

Figure C.2.3.2.2-6 Flow of Management Network Failure Determination (3/6)

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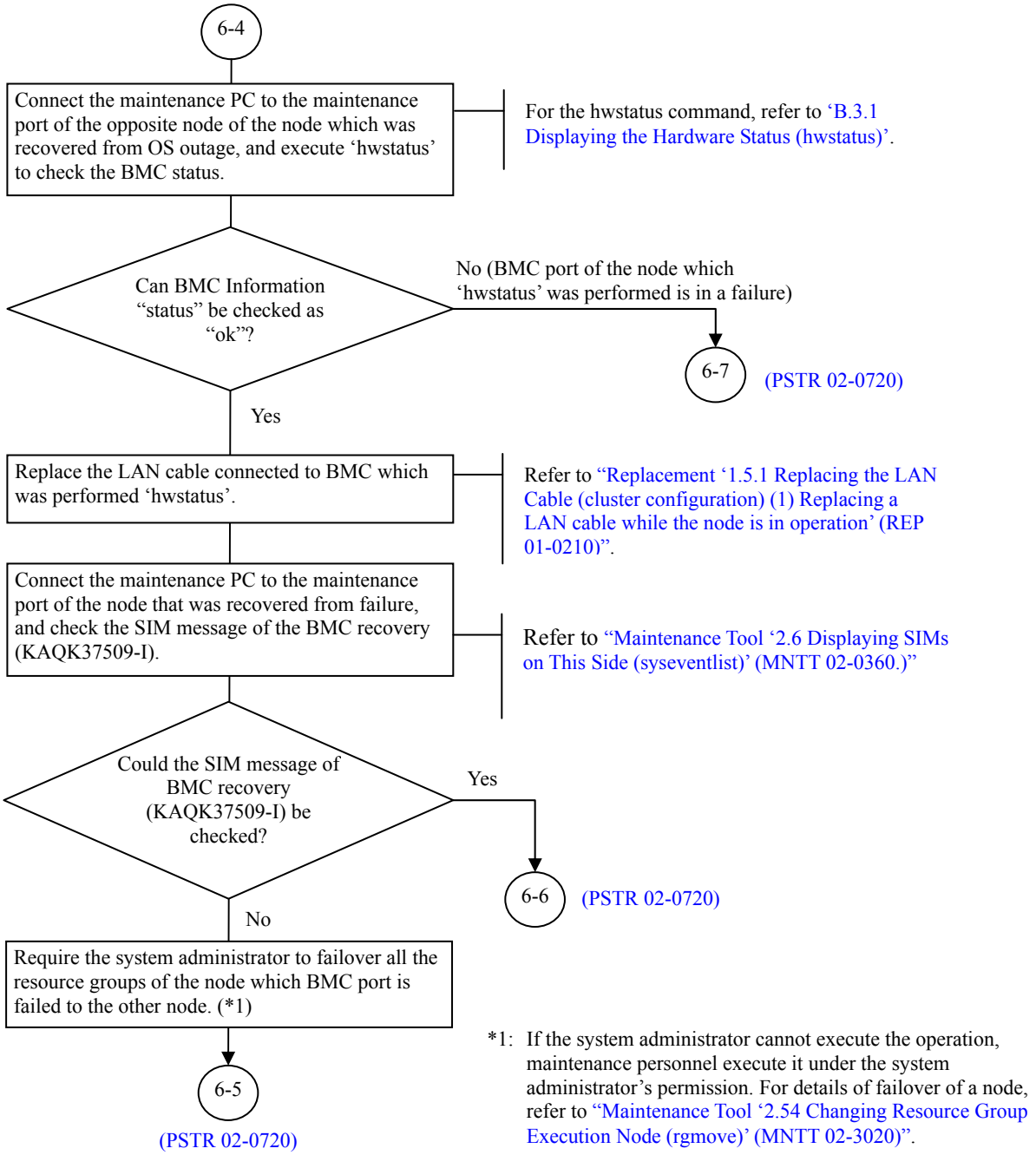

Figure C.2.3.2.2-6 Flow of Management Network Failure Determination (4/6)

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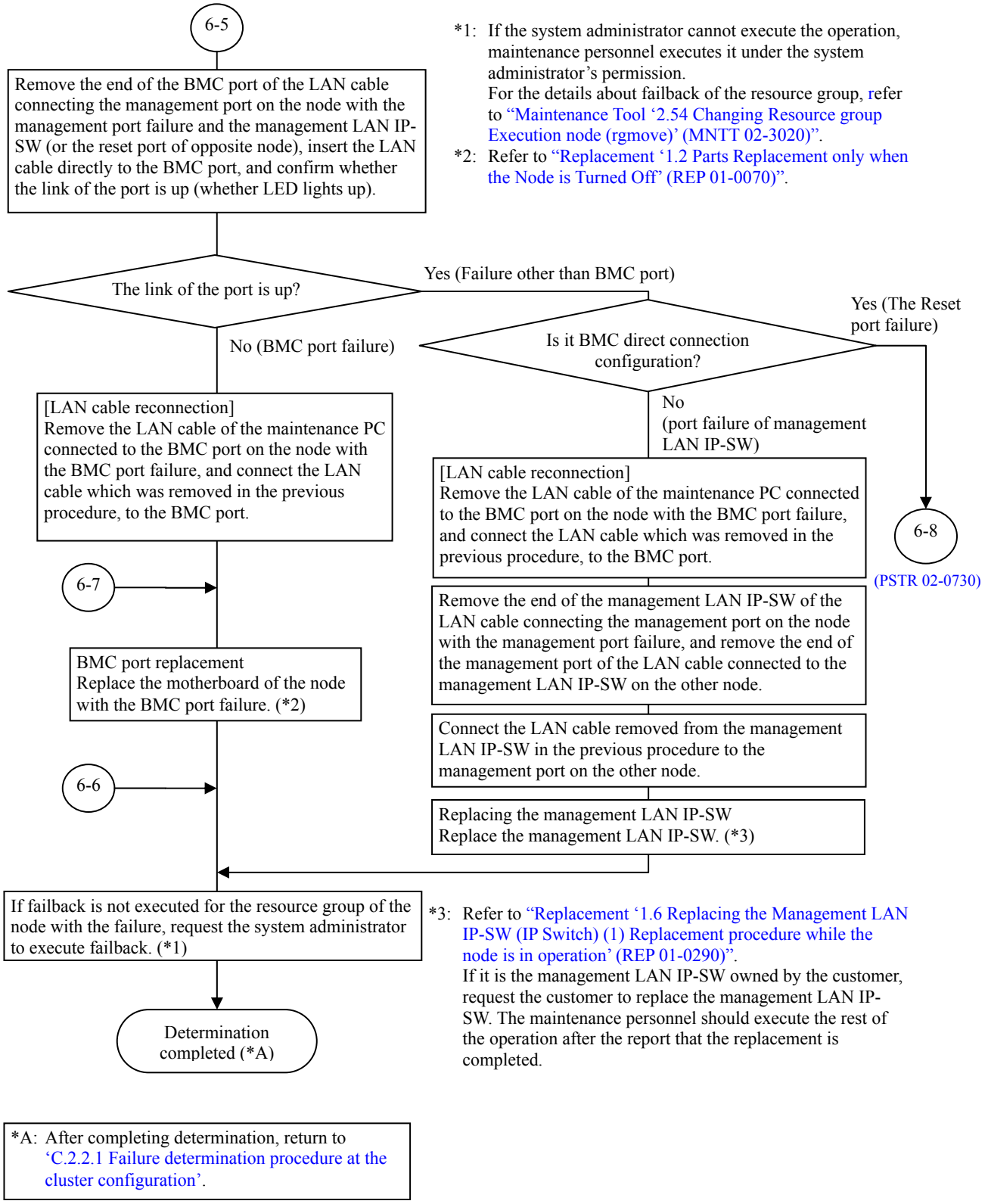

Figure C.2.3.2.2-6 Flow of Management Network Failure Determination (5/6)

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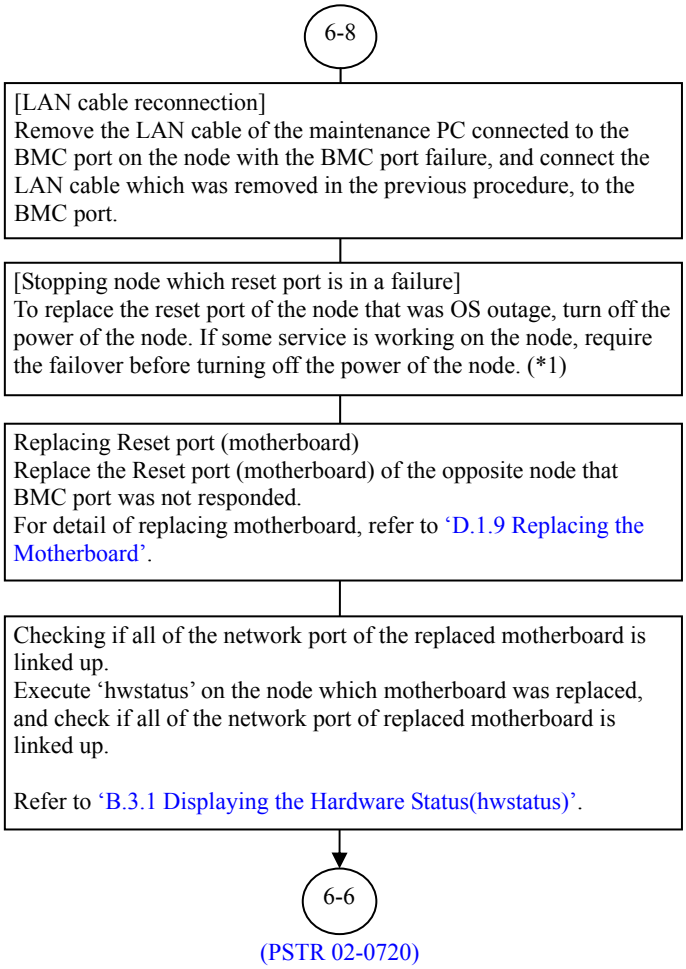

*1: Perform "nasshutdown - -force". For more detail, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

Figure C.2.3.2.2-6 Flow of Management Network Failure Determination (6/6)

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(7) Failure in the management ports of the both nodes

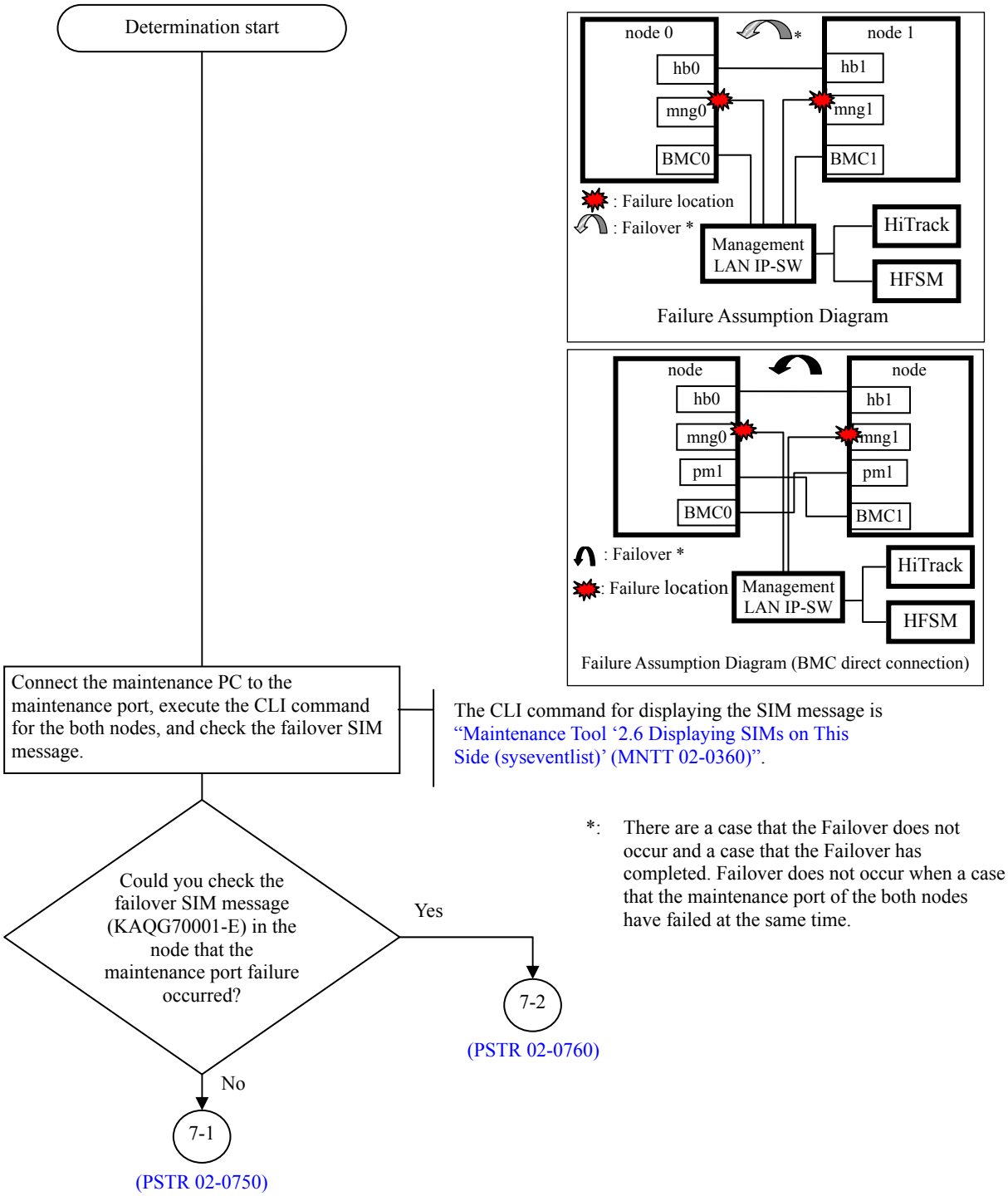

Figure C.2.3.2.2-7 Flow of Management Network Failure Determination (1/11)

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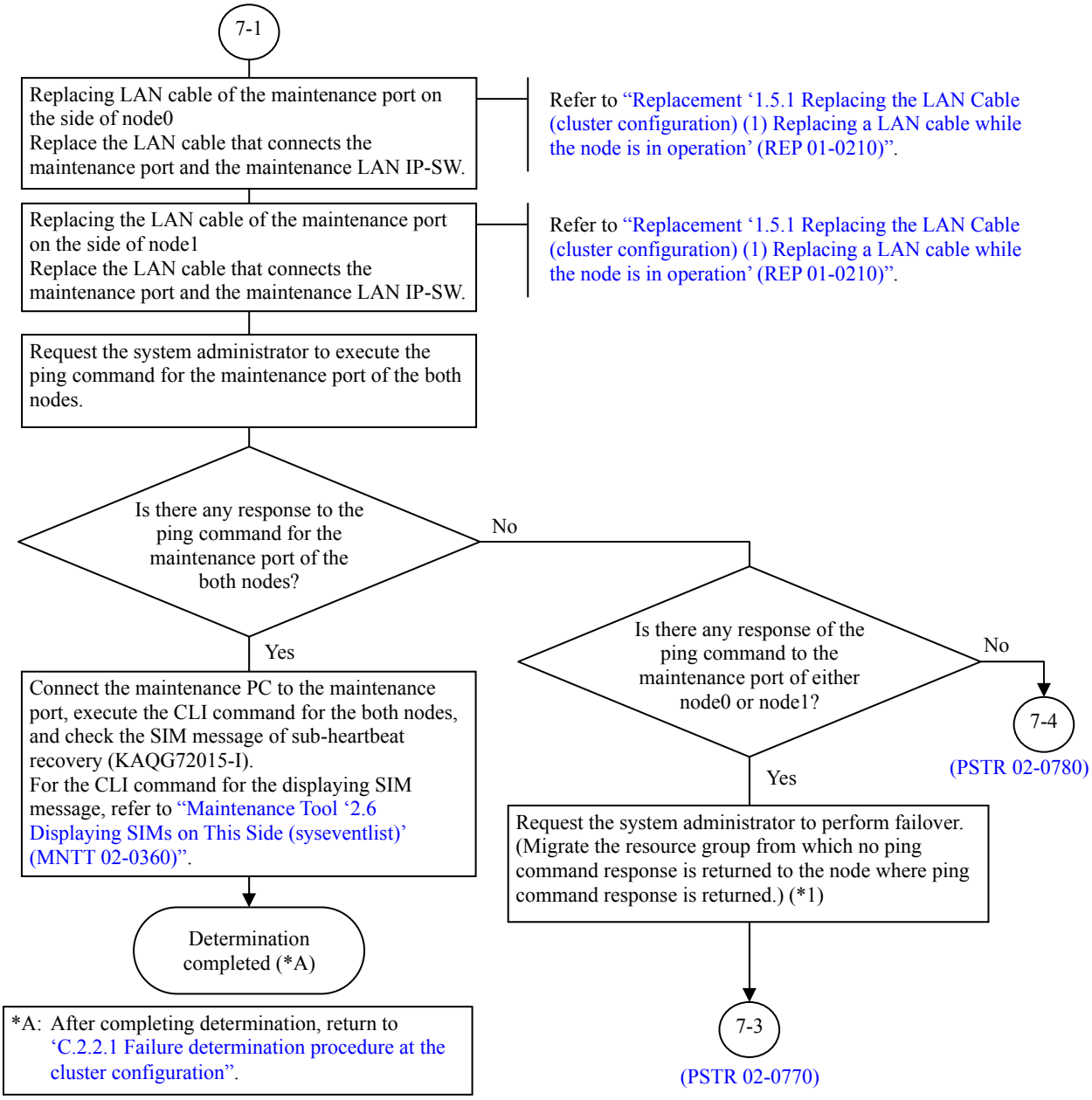

*1: If the system administrator cannot execute the operation, maintenance personnel execute it under the system administrator's permission. For the execution of failover when the resource group is in operation, refer to "Maintenance Tool '2.54 Changing Resource group Execution node (rgmove)' (MNTT 02-3020)".

Figure C.2.3.2.2-7 Flow of Management Network Failure Determination (2/11)

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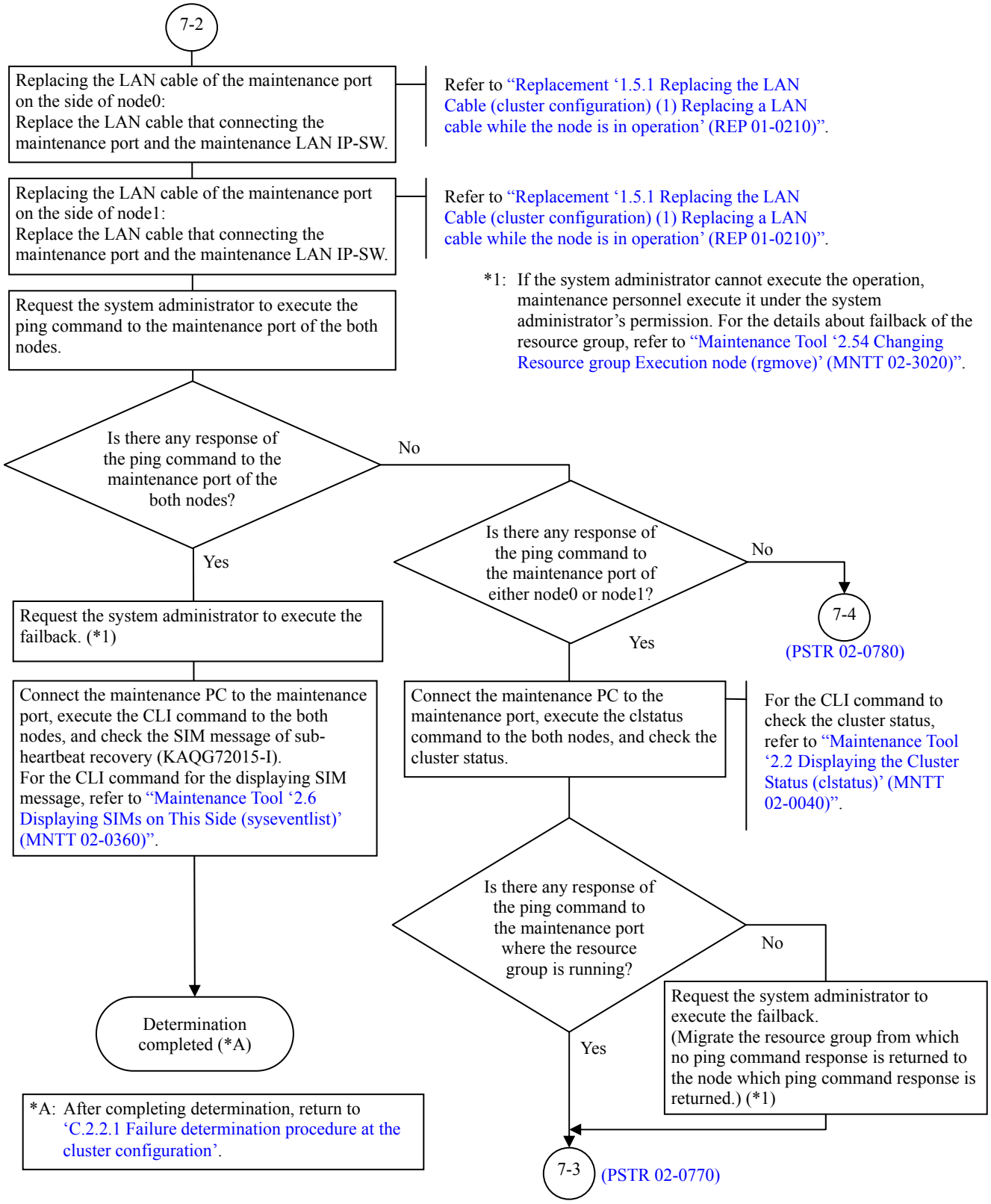

Figure C.2.3.2.2-7 Flow of Management Network Failure Determination (3/11)

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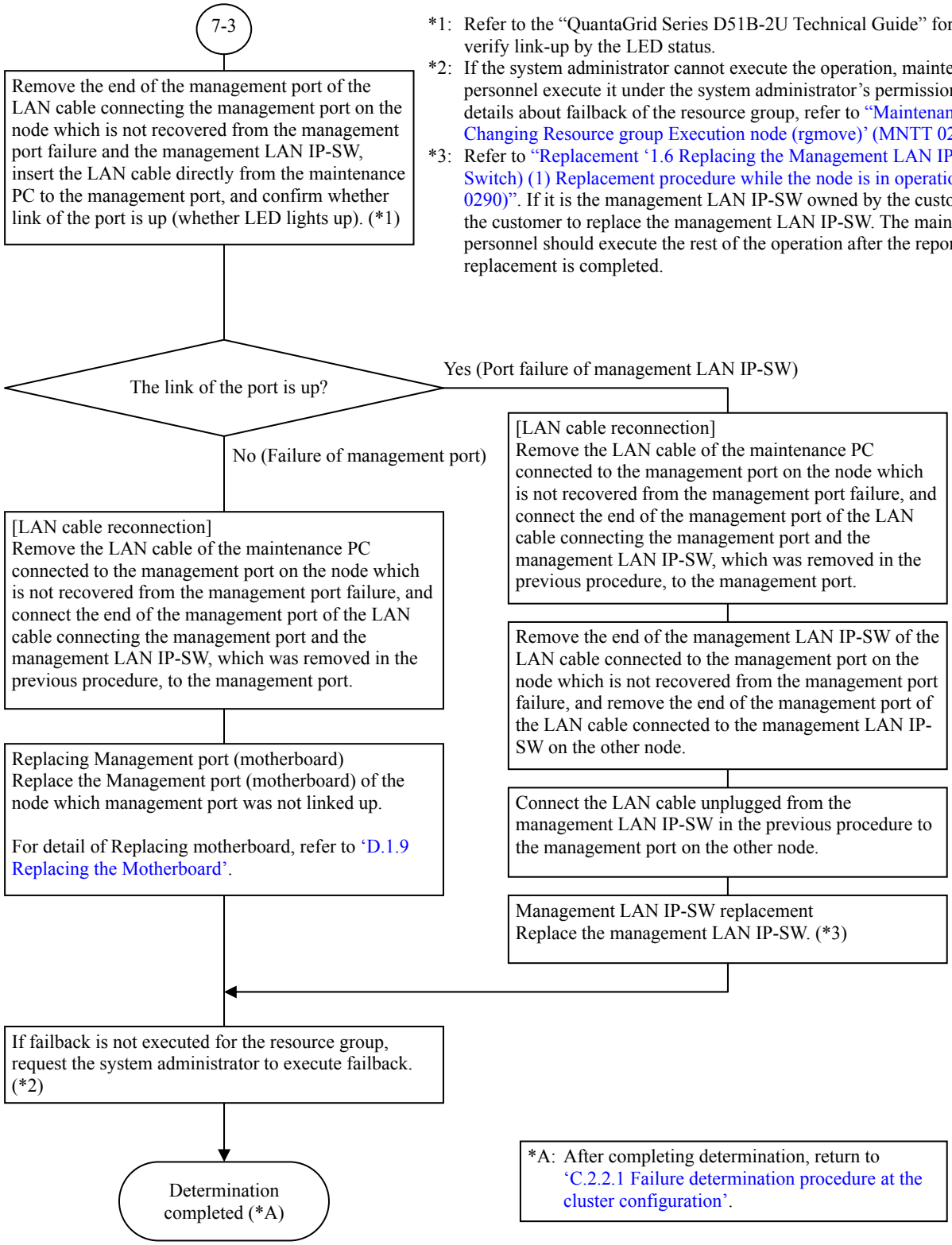

Figure C.2.3.2.2-7 Flow of Management Network Failure Determination (4/11)

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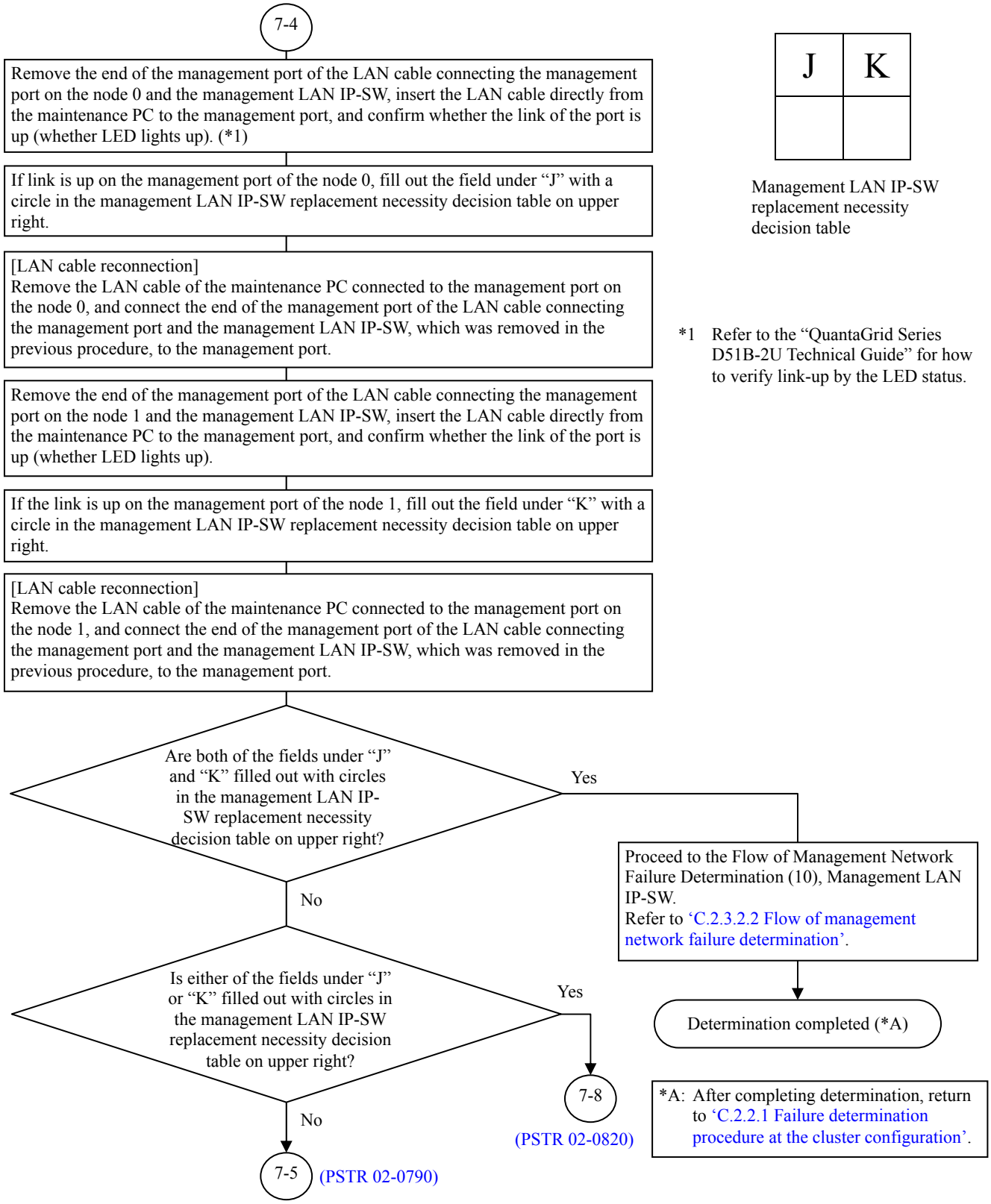

Figure C.2.3.2.2-7 Flow of Management Network Failure Determination (5/11)

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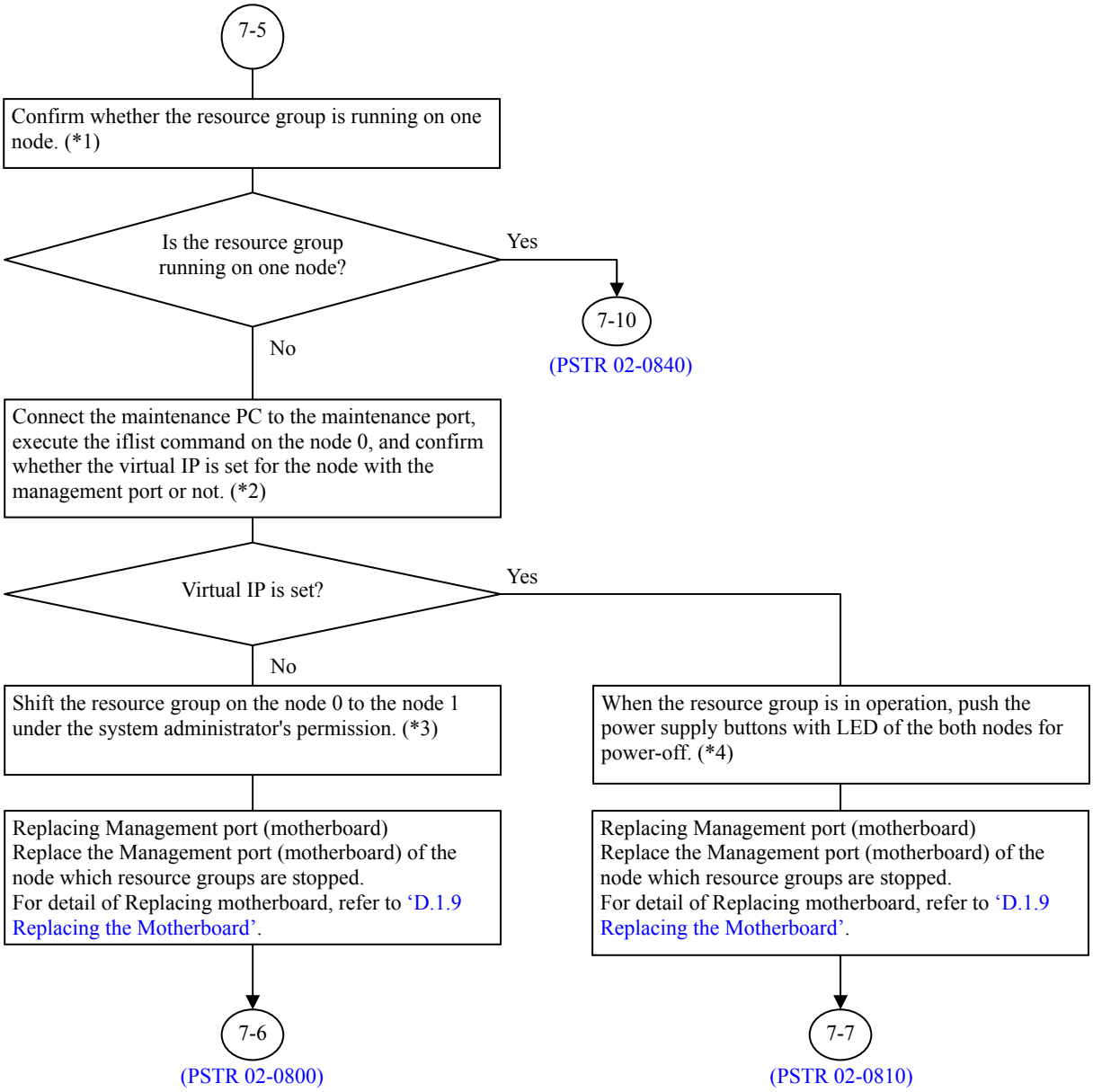

*1: For the confirmation of the resource group, refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)".
*2: Refer to "Maintenance Tool '2.4 Displaying the Network Status (iflist)' (MNTT 02-0200)".
*3: Maintenance personnel should execute it under the system administrator's permission. For the details about failback of the resource group, refer to "Maintenance Tool '2.54 Changing Resource group Execution node (rgmove)' (MNTT 02-3020)".
*4: Refer to "Installation '2.1.2.2 Terminating the OS of the node by operating the power button' (INST 02-0080)".

Figure C.2.3.2.2-7 Flow of Management Network Failure Determination (6/11)

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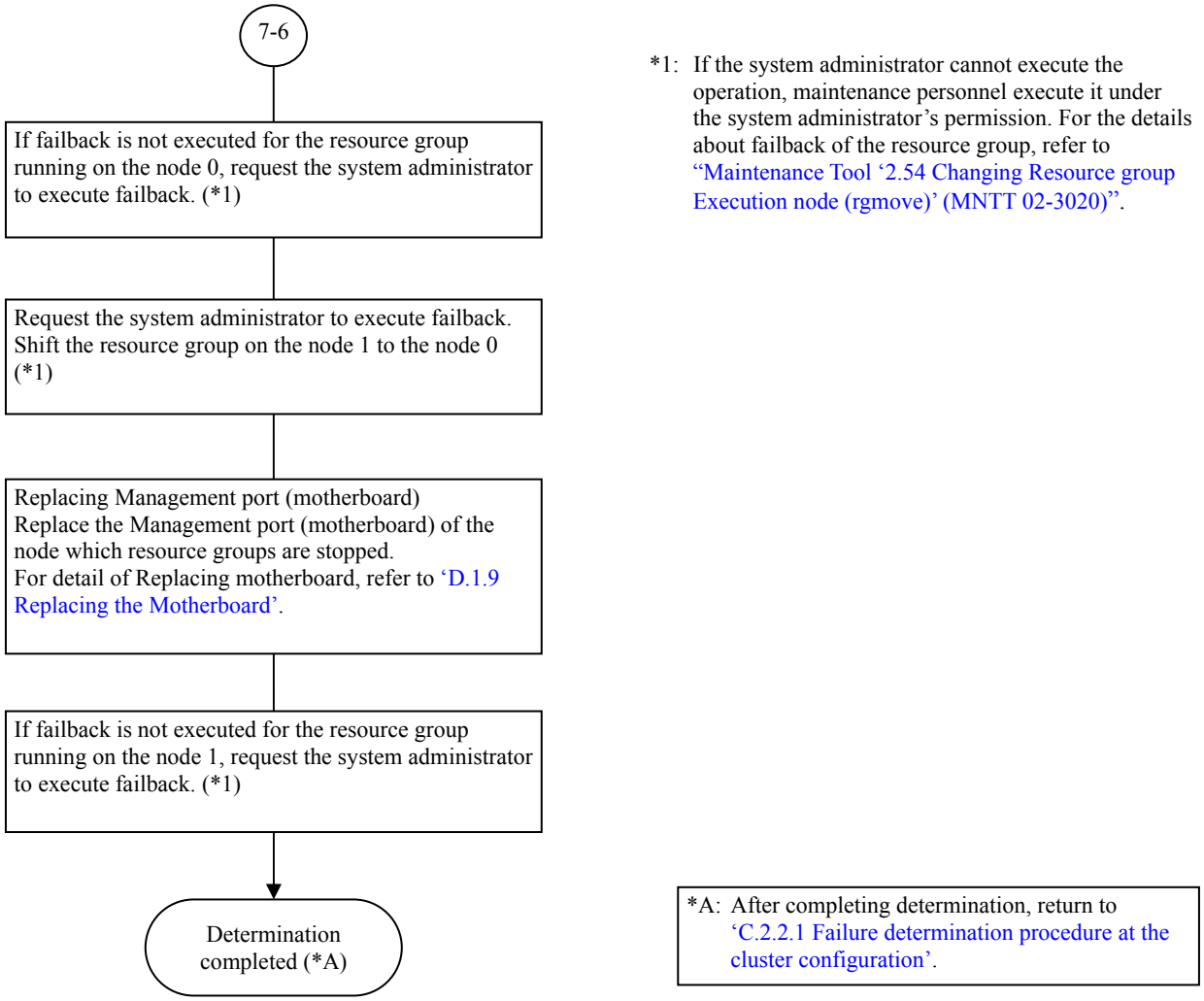

Figure C.2.3.2.2-7 Flow of Management Network Failure Determination (7/11)

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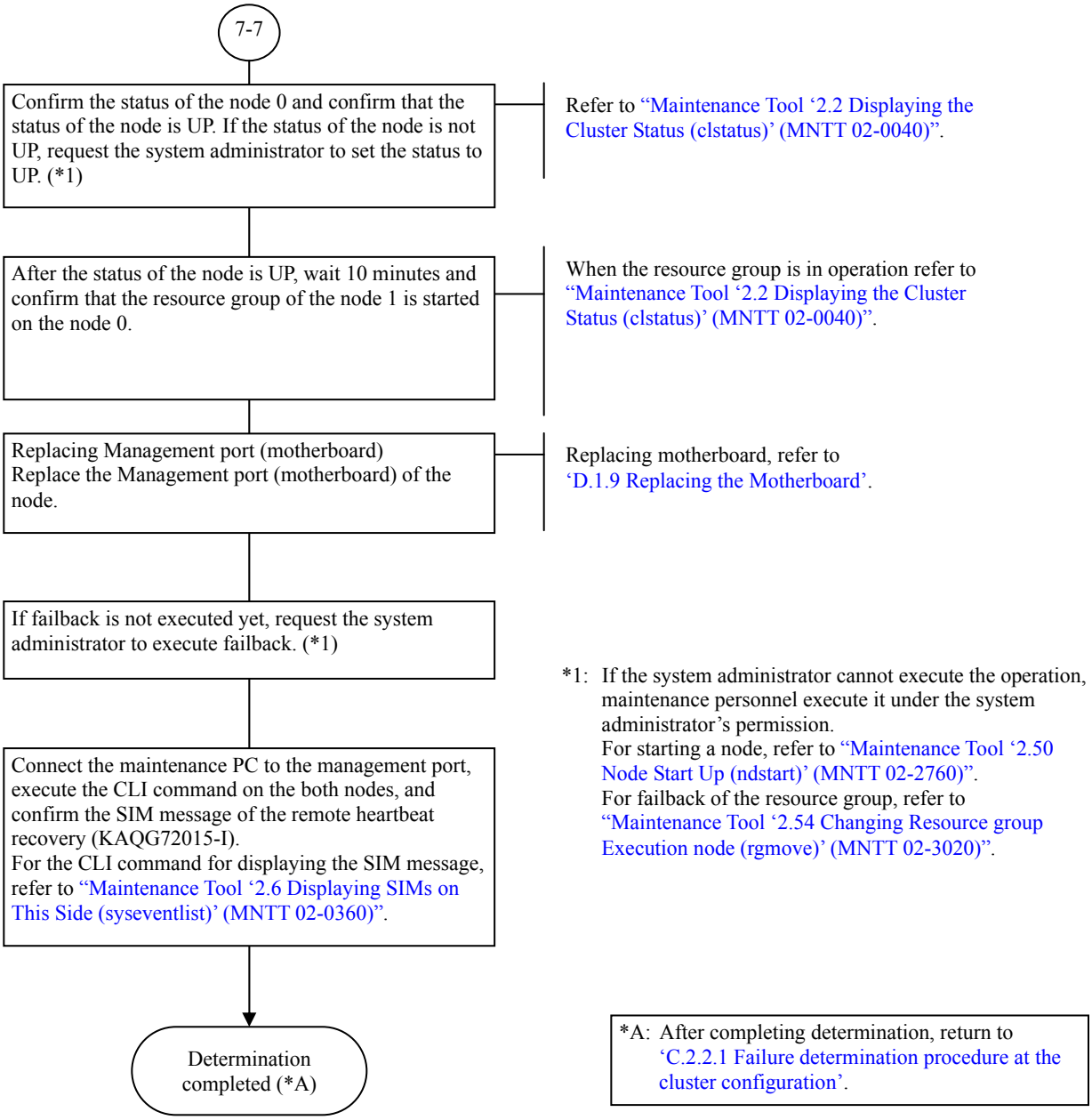

Figure C.2.3.2.2-7 Flow of Management Network Failure Determination (8/11)

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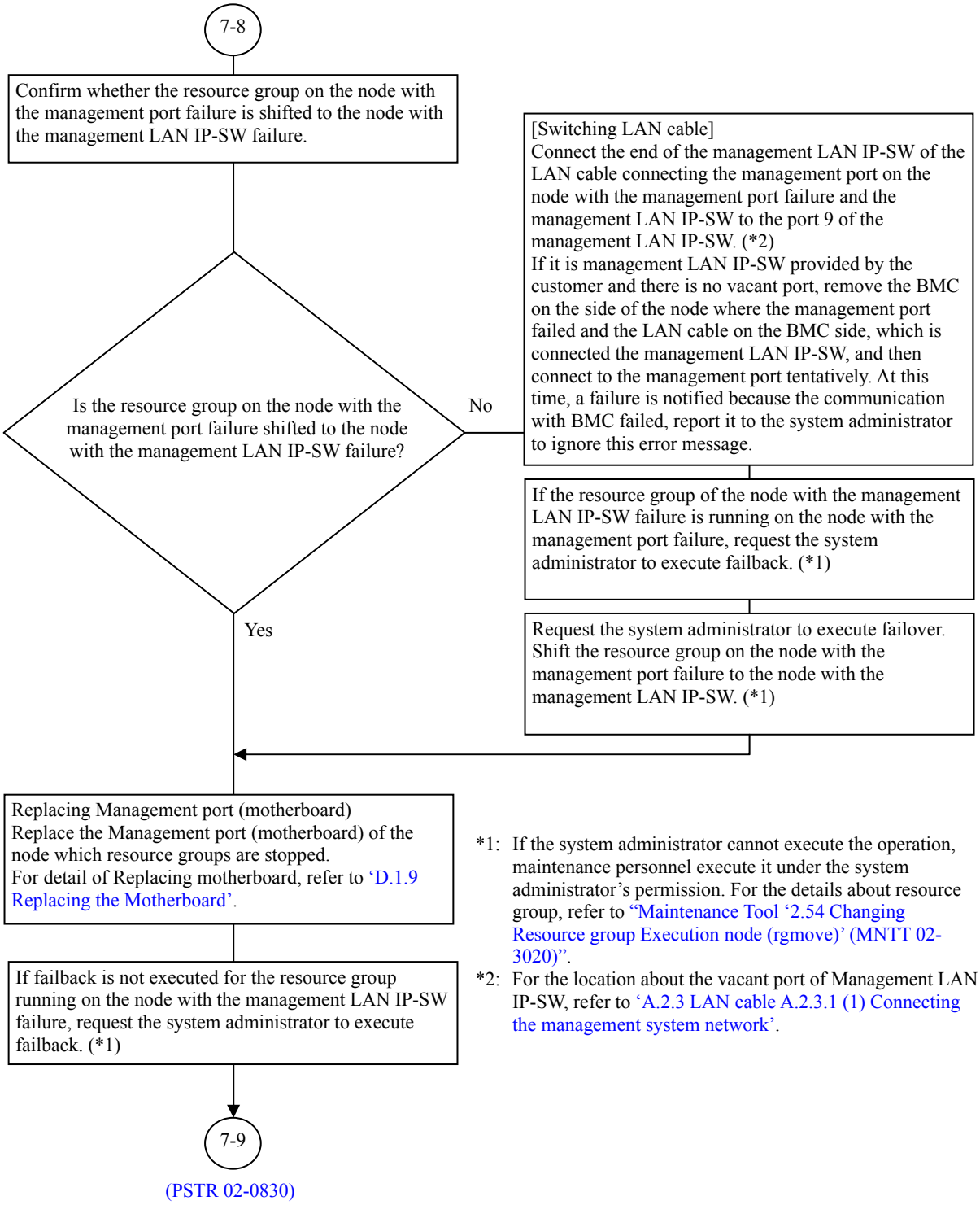

*1: If the system administrator cannot execute the operation, maintenance personnel execute it under the system administrator's permission. For the details about resource group, refer to "Maintenance Tool '2.54 Changing Resource group Execution node (rgmove)' (MNTT 02-3020)".

*2: For the location about the vacant port of Management LAN IP-SW, refer to 'A.2.3 LAN cable A.2.3.1 (1) Connecting the management system network'.

Figure C.2.3.2.2-7 Flow of Management Network Failure Determination (9/11)

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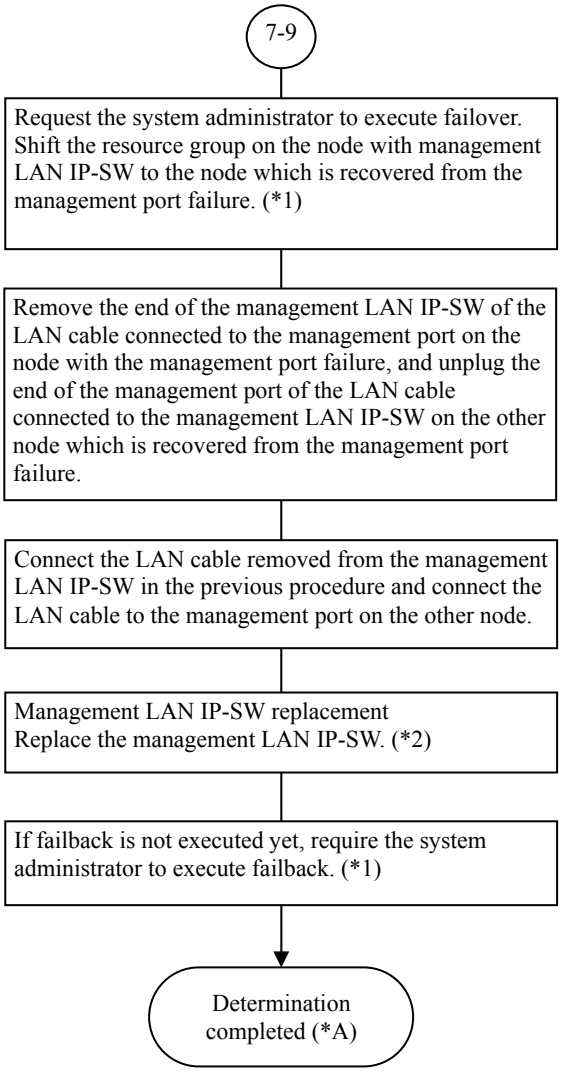

*1: If the system administrator cannot execute the operation, maintenance personnel execute it under the system administrator's permission. For the details about resource group, refer to "Maintenance Tool '2.54 Changing Resource group Execution node (rgmove)' (MNTT 02-3020)".

*2: For the location of a free port in the management LAN IP-SW, refer to "Replacement '1.6 Replacing the Management LAN IP-SW (IP Switch) (1) Replacement procedure while the node is in operation' (REP 01-0290)". If it is the management LAN IP-SW owned by the customer, request the customer to replace the management LAN IP-SW. request the replacement. The maintenance personnel should execute the rest of the operation after the report that the replacement is completed.

*A: After completing determination, return to 'C.2.2.1 Failure determination procedure at the cluster configuration'.

Figure C.2.3.2.2-7 Flow of Management Network Failure Determination (10/11)

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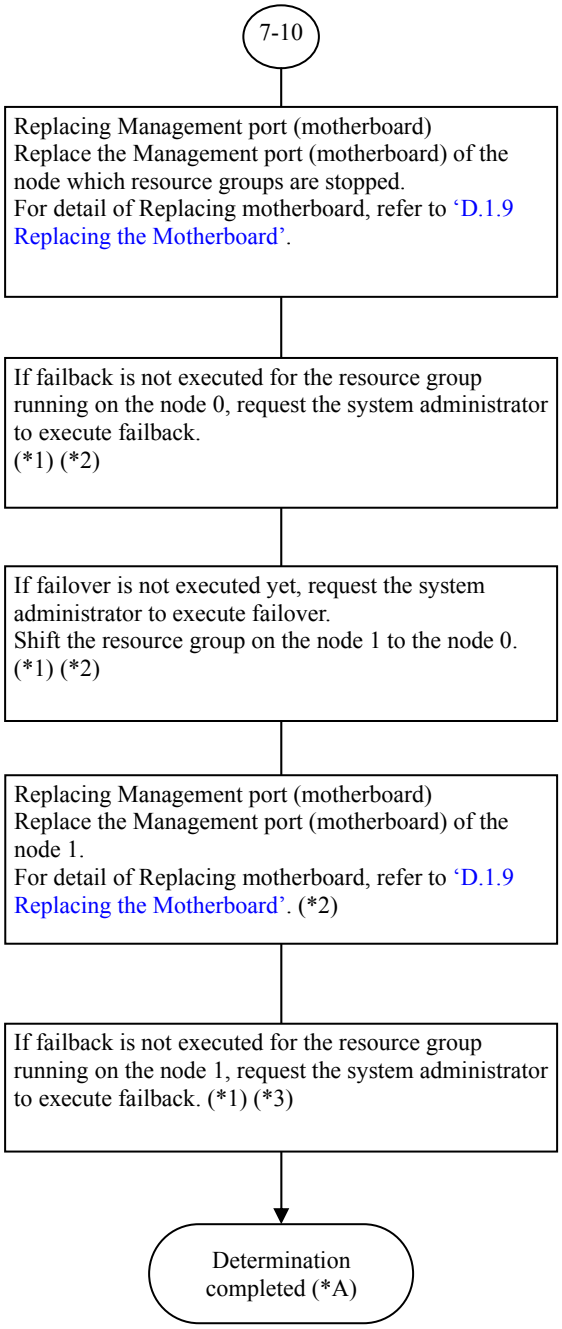

*1: If the system administrator cannot execute the operation, maintenance personnel execute it under the system administrator's permission. For the details about resource group, refer to "Maintenance Tool '2.54 Changing Resource group Execution node (rgmove)' (MNTT 02-3020)".

*2: If the management port on the node 1 is already replaced, read the node 1 as the node 0, and the node 0 as the node 1.

*3: If the management port on the node 0 is replaced in the previous procedure, read the node 1 as the node 0.

*A: After completing determination, return to 'C.2.2.1 Failure determination procedure at the cluster configuration'.

Figure C.2.3.2.2-7 Flow of Management Network Failure Determination (11/11)

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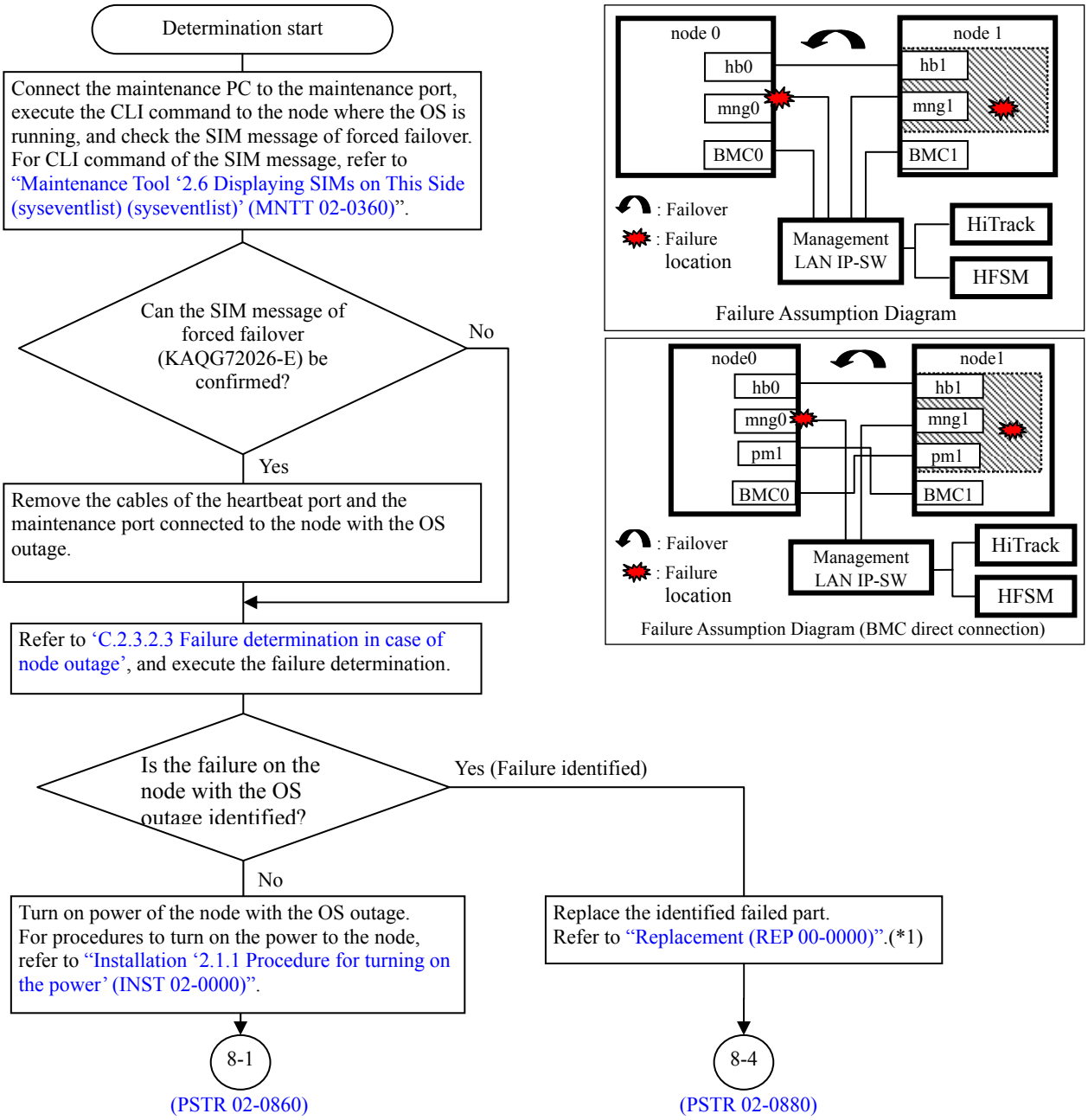
(8) Failure in the management port of the other node after the OS down and the failover completion



*1: Replace the parts and confirm after the replacement with the heartbeat cable and the management port cable removed. Do not request the system administrator to execute failback.

Figure C.2.3.2.2-8 Flow of Management Network Failure Determination (1/7)

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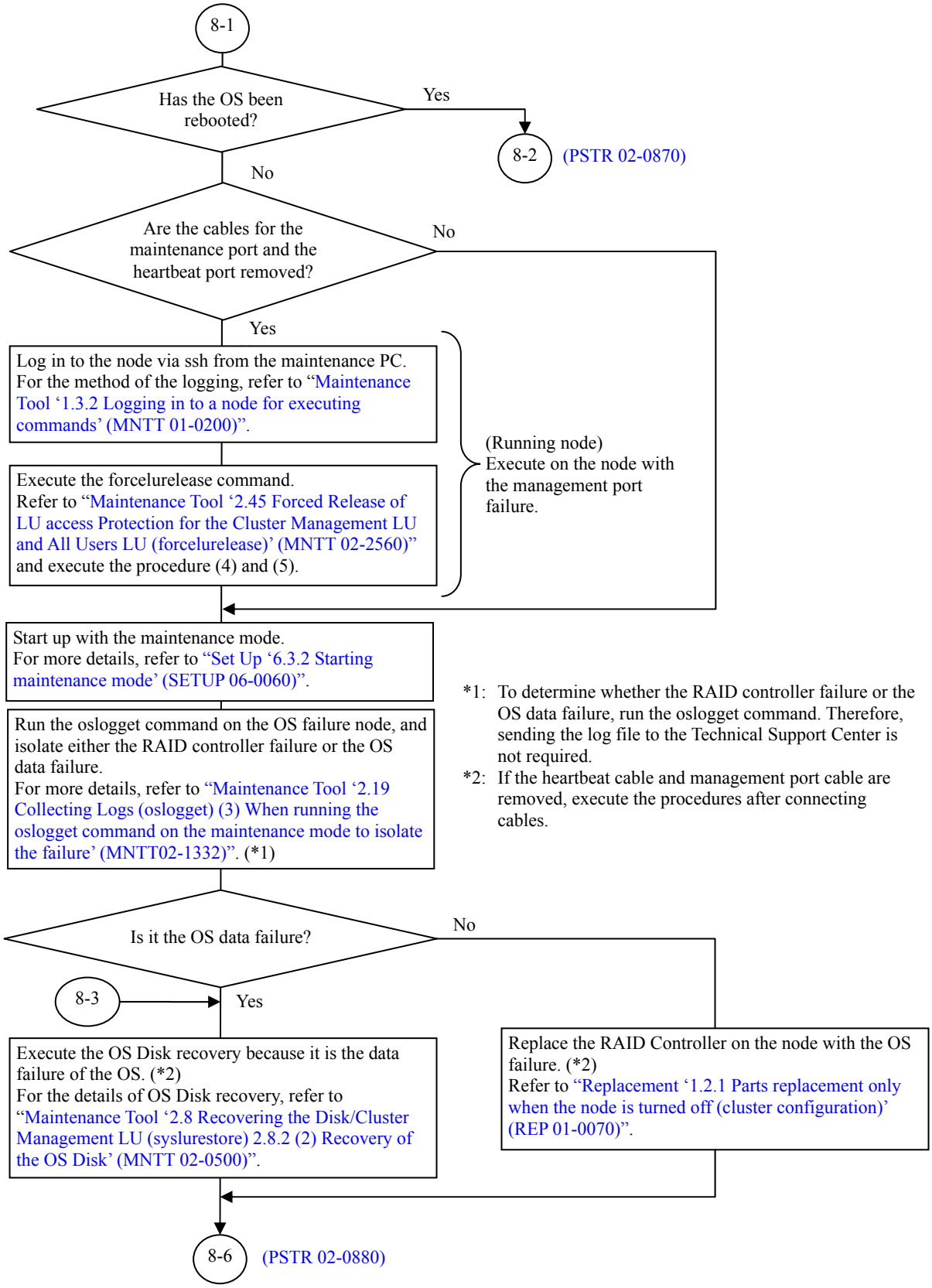

Figure C.2.3.2.2-8 Flow of Management Network Failure Determination (2/7)

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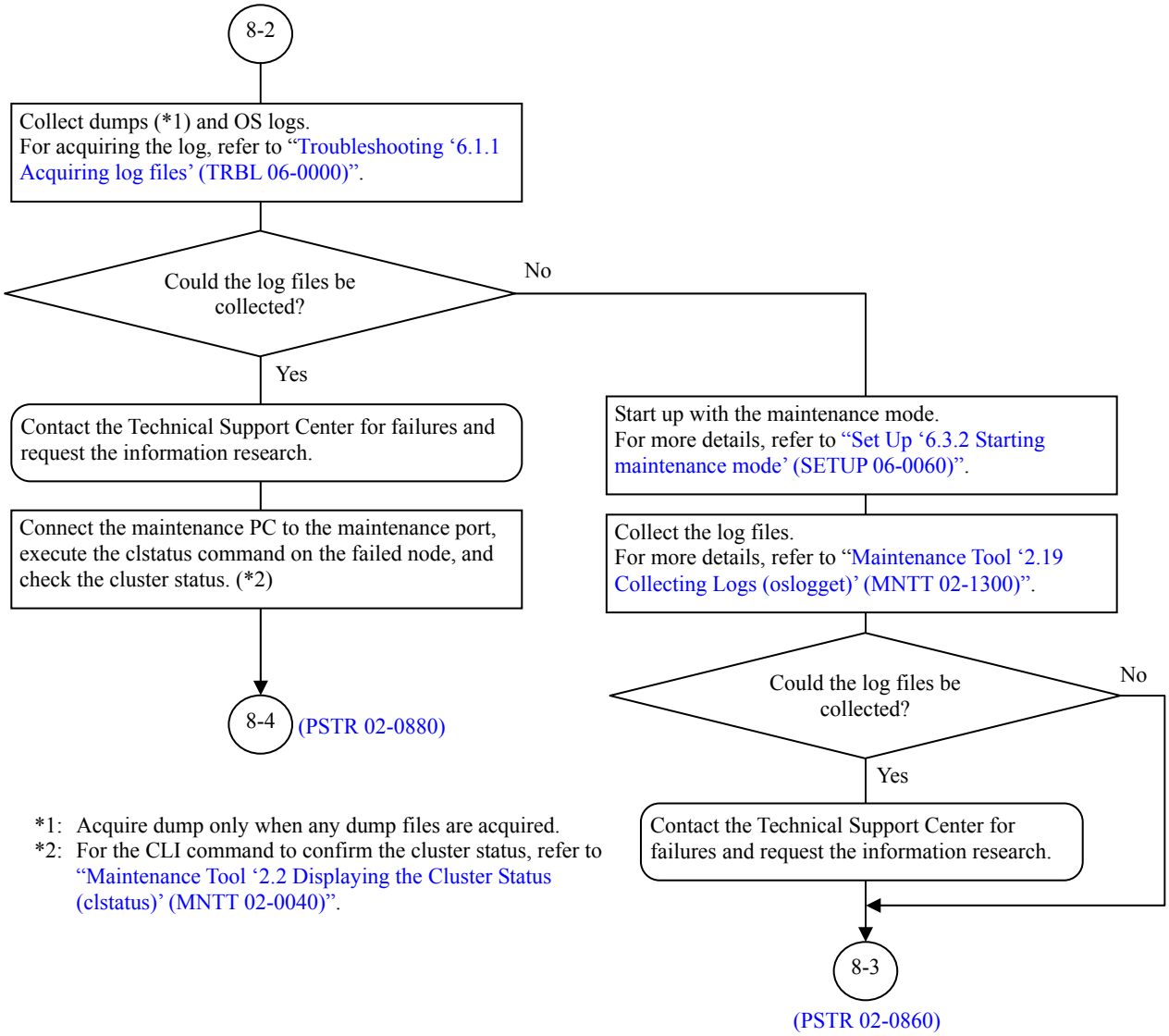

*1: Acquire dump only when any dump files are acquired.
*2: For the CLI command to confirm the cluster status, refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)".

Figure C.2.3.2.2-8 Flow of Management Network Failure Determination (3/7)

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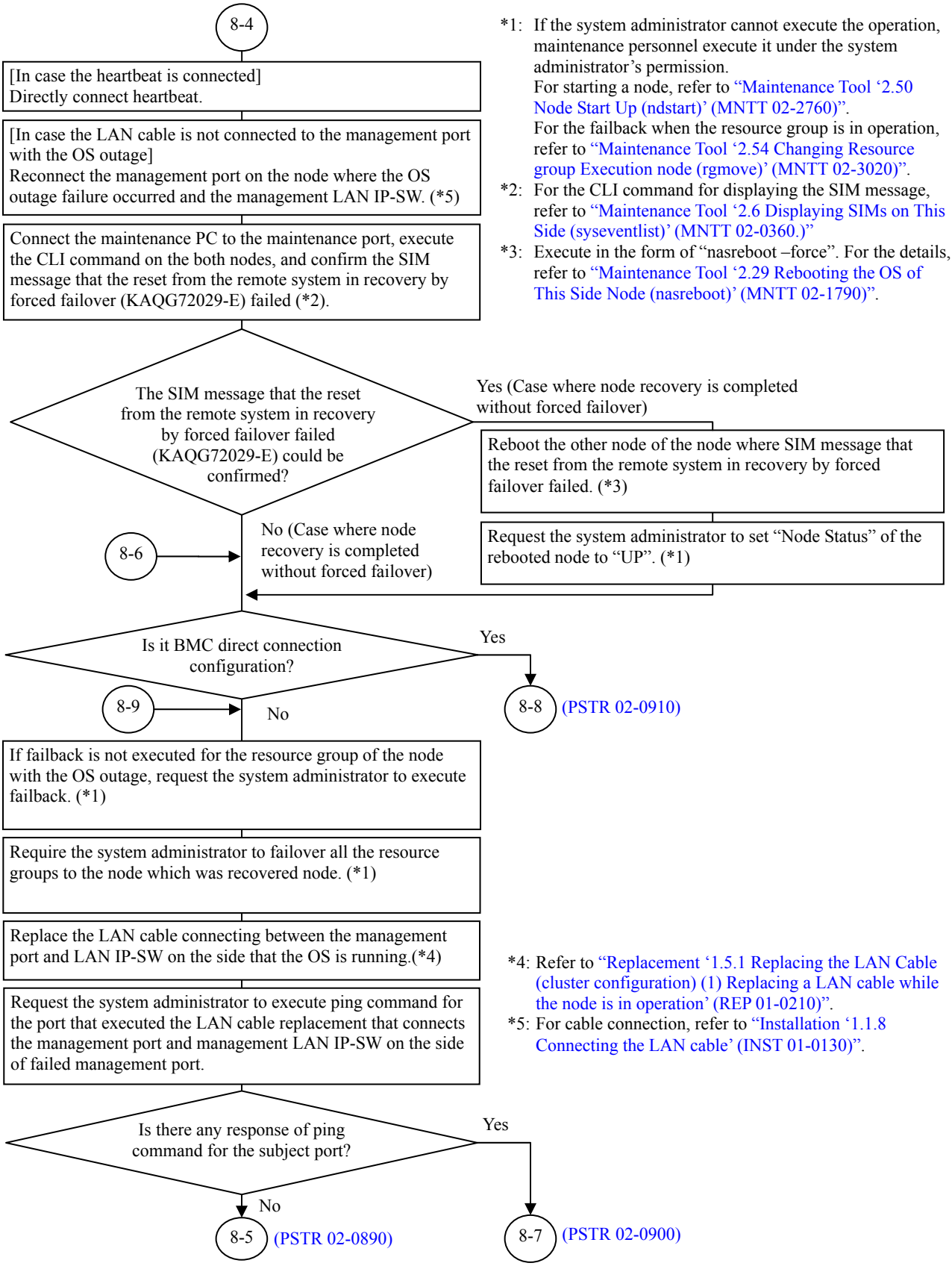

*1: If the system administrator cannot execute the operation, maintenance personnel execute it under the system administrator's permission.
For starting a node, refer to "Maintenance Tool '2.50 Node Start Up (ndstart)' (MNTT 02-2760)".
For the failback when the resource group is in operation, refer to "Maintenance Tool '2.54 Changing Resource group Execution node (rgmove)' (MNTT 02-3020)".

*2: For the CLI command for displaying the SIM message, refer to "Maintenance Tool '2.6 Displaying SIMs on This Side (syseventlist)' (MNTT 02-0360.)"

*3: Execute in the form of "nasreboot –force". For the details, refer to "Maintenance Tool '2.29 Rebooting the OS of This Side Node (nasreboot)' (MNTT 02-1790)".

*4: Refer to "Replacement '1.5.1 Replacing the LAN Cable (cluster configuration) (1) Replacing a LAN cable while the node is in operation' (REP 01-0210)".

*5: For cable connection, refer to "Installation '1.1.8 Connecting the LAN cable' (INST 01-0130)".

Figure C.2.3.2.2-8 Flow of Management Network Failure Determination (4/7)

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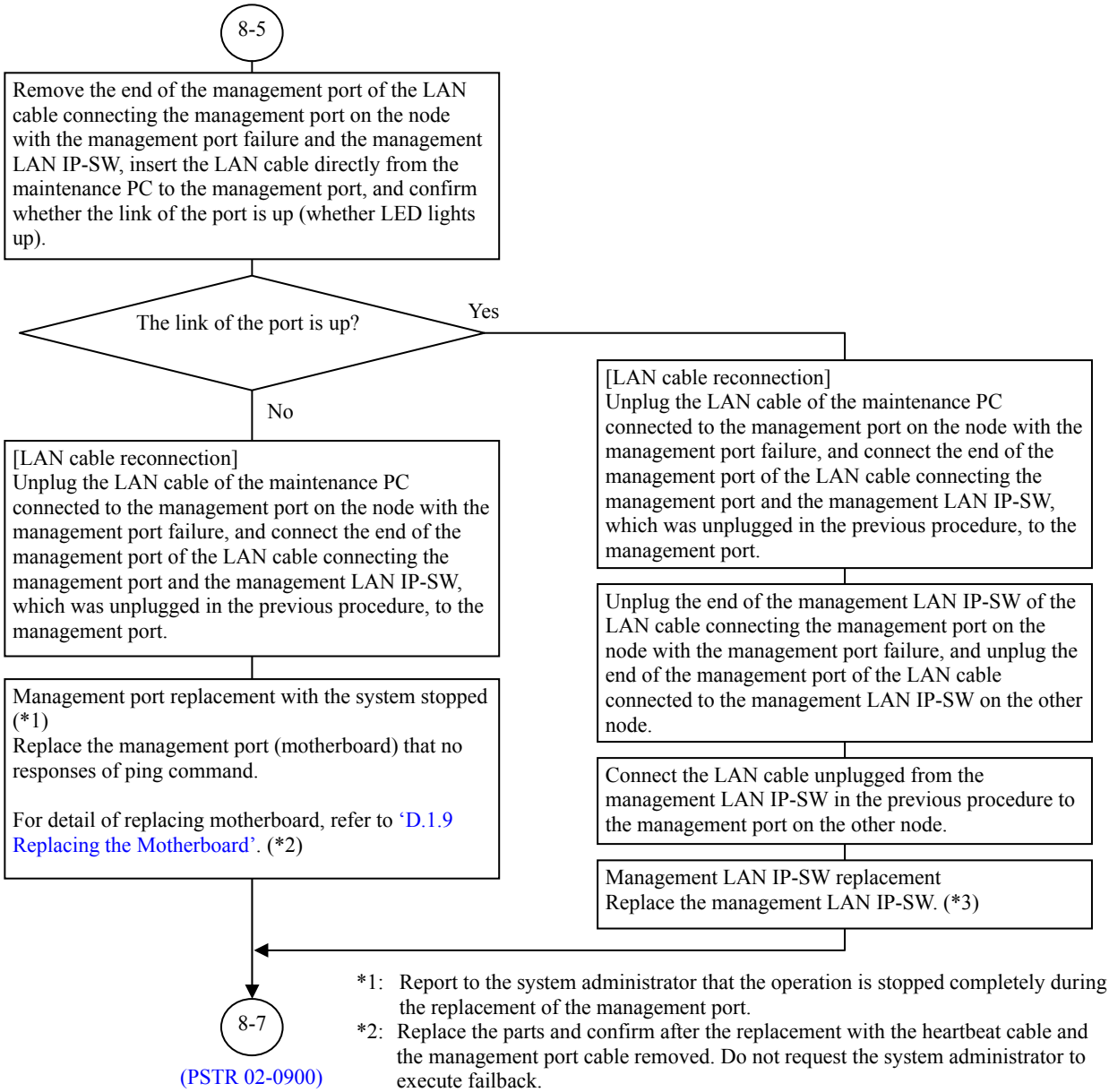

*1: Report to the system administrator that the operation is stopped completely during the replacement of the management port.

*2: Replace the parts and confirm after the replacement with the heartbeat cable and the management port cable removed. Do not request the system administrator to execute failback.

*3: Refer to "Replacement '1.6 Replacing the Management LAN IP-SW (IP Switch) (1) Replacement procedure while the node is in operation' (REP 01-0290)". If it is the management LAN IP-SW owned by the customer, request the customer to replace the management LAN IP-SW. The maintenance personnel should execute the rest of the operation after the report that the replacement is completed.

Figure C.2.3.2.2-8 Flow of Management Network Failure Determination (5/7)

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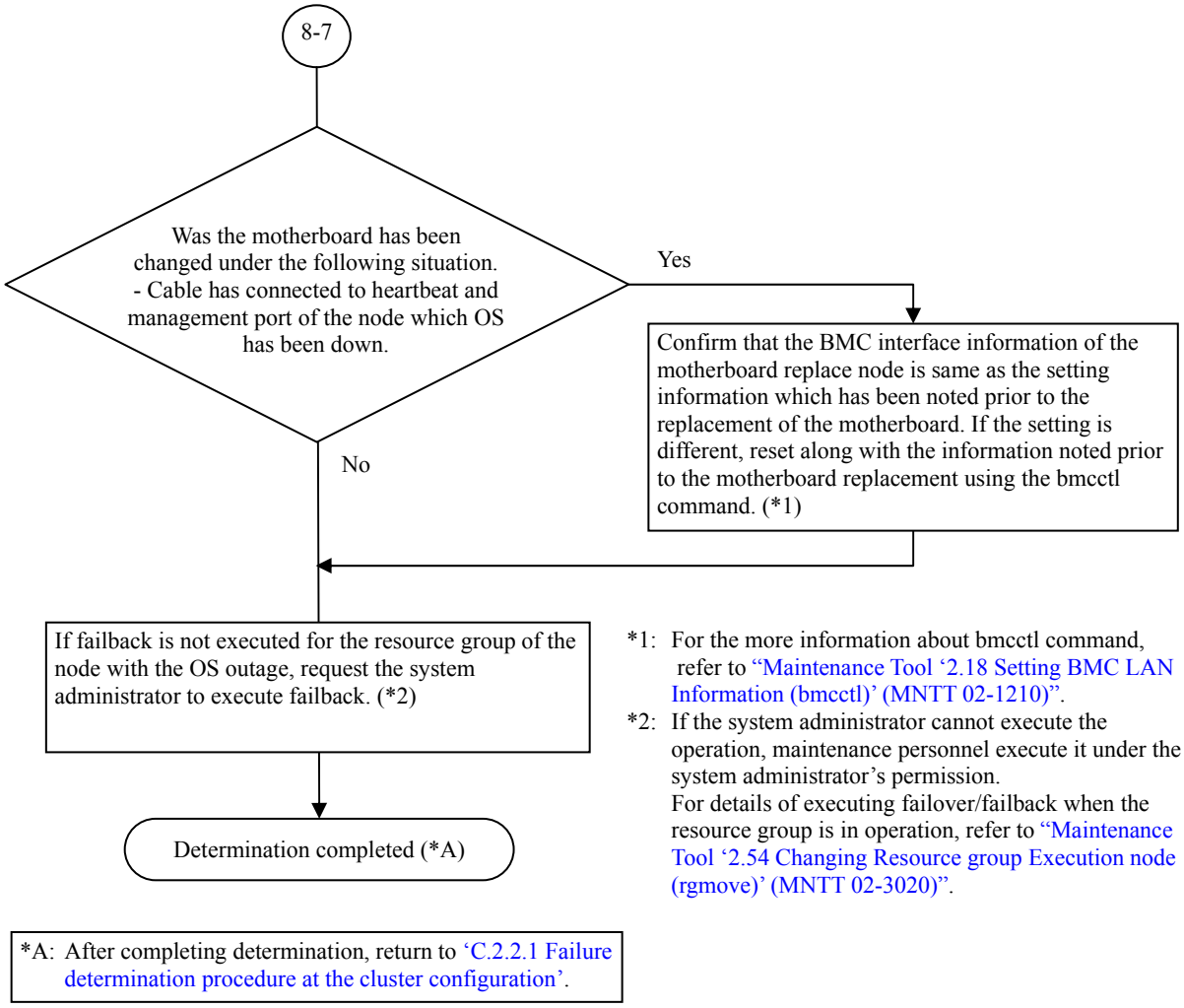

*1: For the more information about bmcctl command, refer to "Maintenance Tool '2.18 Setting BMC LAN Information (bmcctl)' (MNTT 02-1210)".

*2: If the system administrator cannot execute the operation, maintenance personnel execute it under the system administrator's permission.
For details of executing failover/failback when the resource group is in operation, refer to "Maintenance Tool '2.54 Changing Resource group Execution node (rgmove)' (MNTT 02-3020)".

*A: After completing determination, return to 'C.2.2.1 Failure determination procedure at the cluster configuration'.

Figure C.2.3.2.2-8 Flow of Management Network Failure Determination (6/7)

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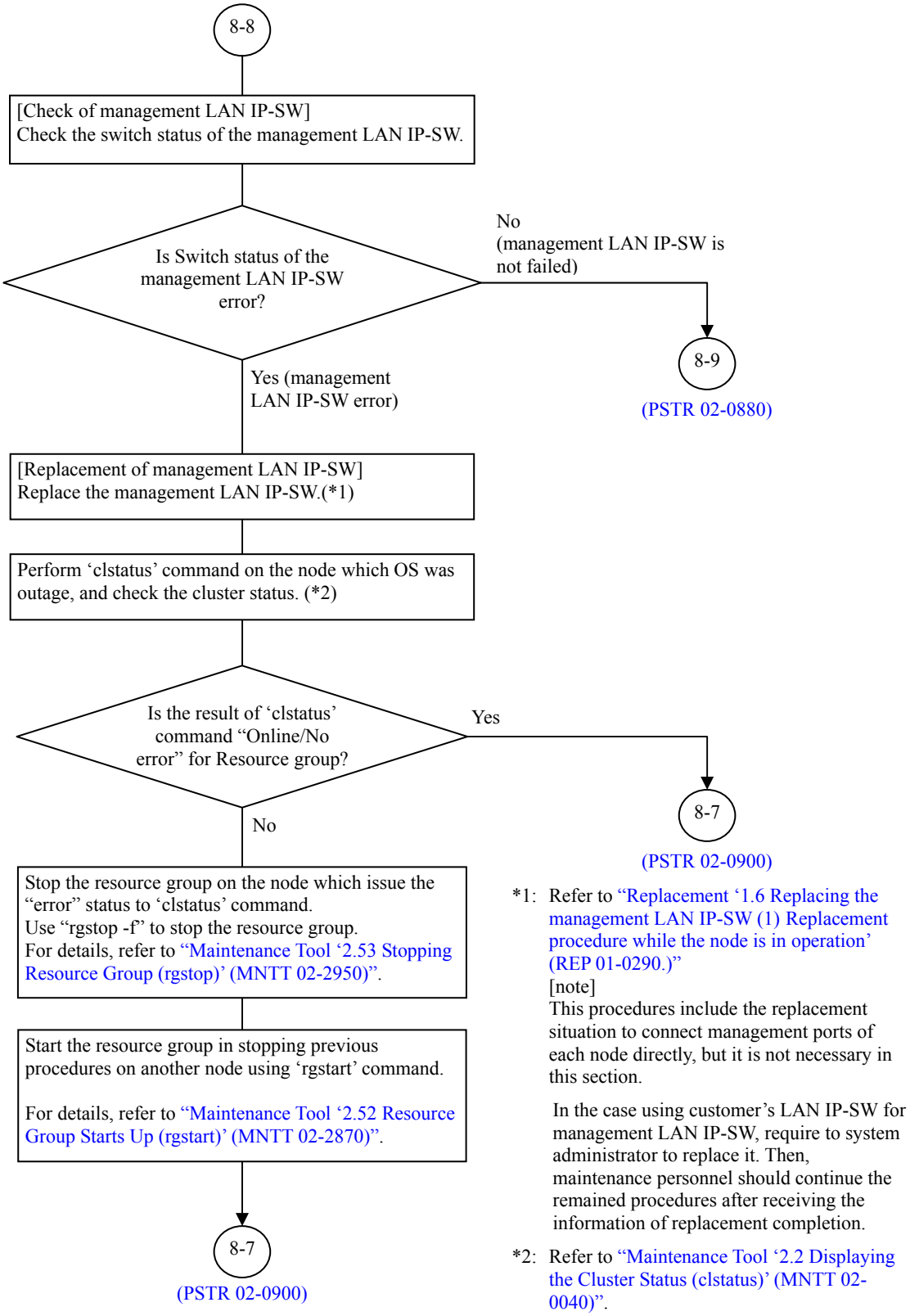

Figure C.2.3.2.2-8 Flow of Management Network Failure Determination (7/7)

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(9) Dual failure of OS

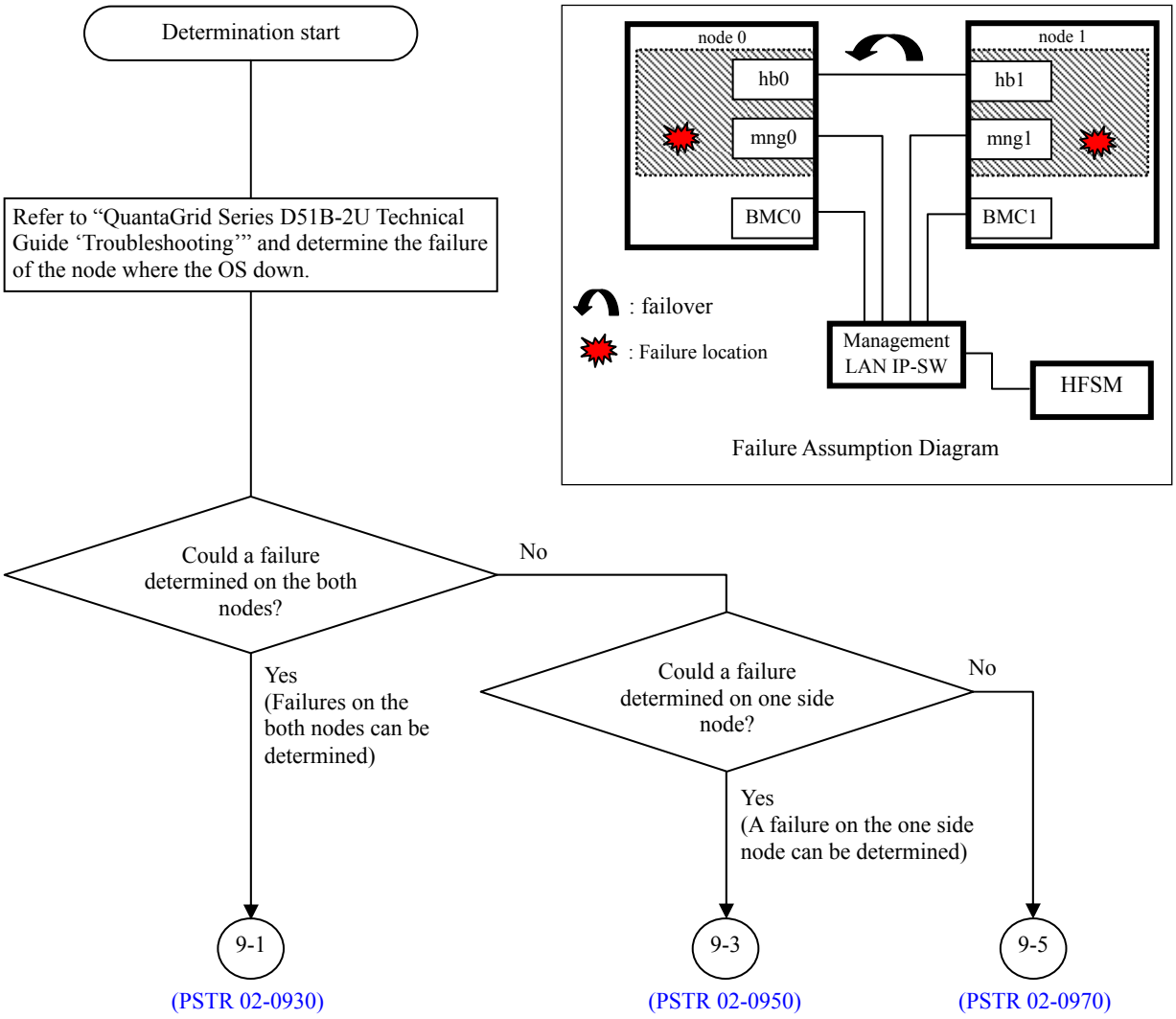

Figure C.2.3.2.2-9 Flow of Management Network Failure Determination (1/6)

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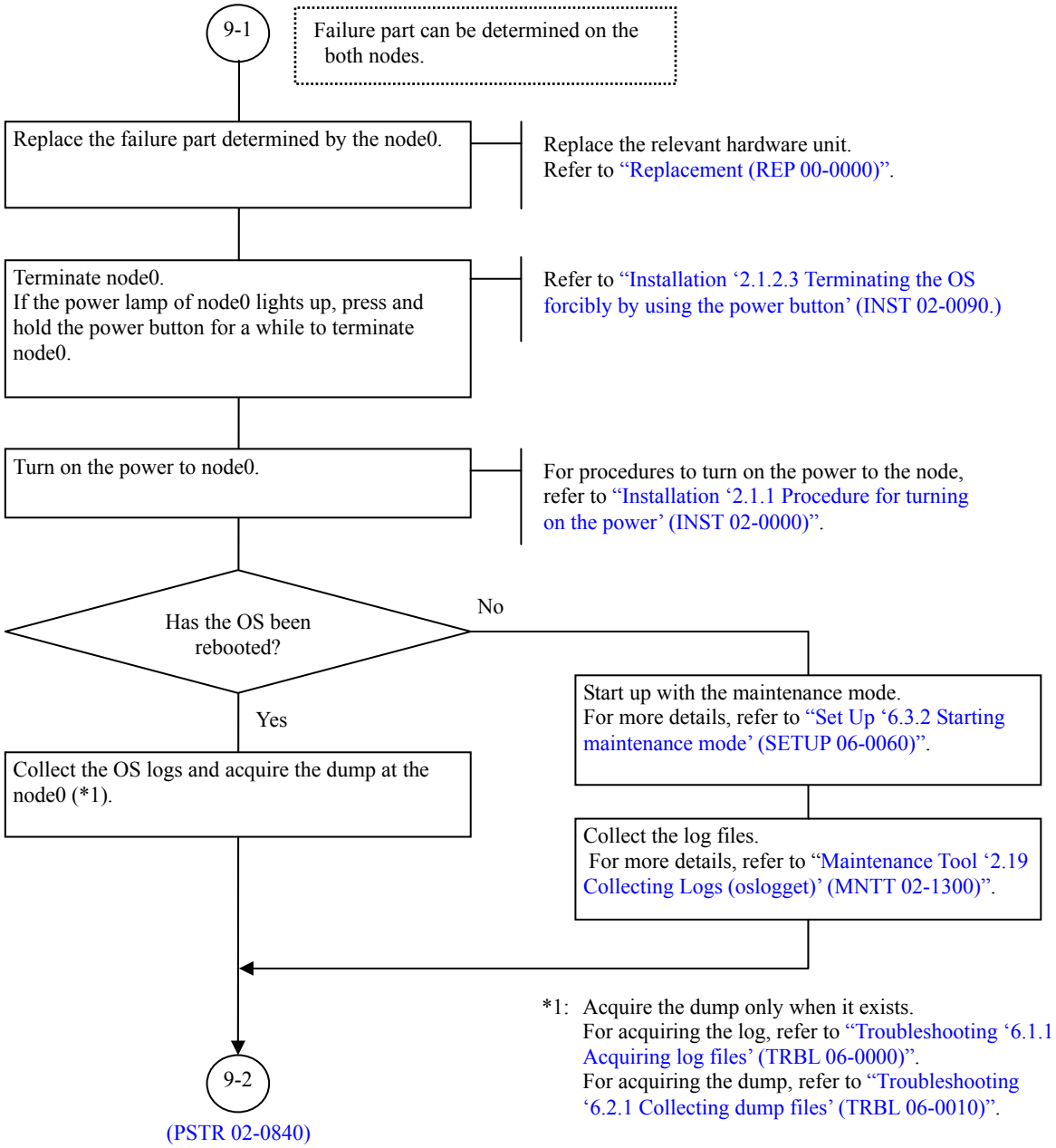

Figure C.2.3.2.2-9 Flow of Management Network Failure Determination (2/6)

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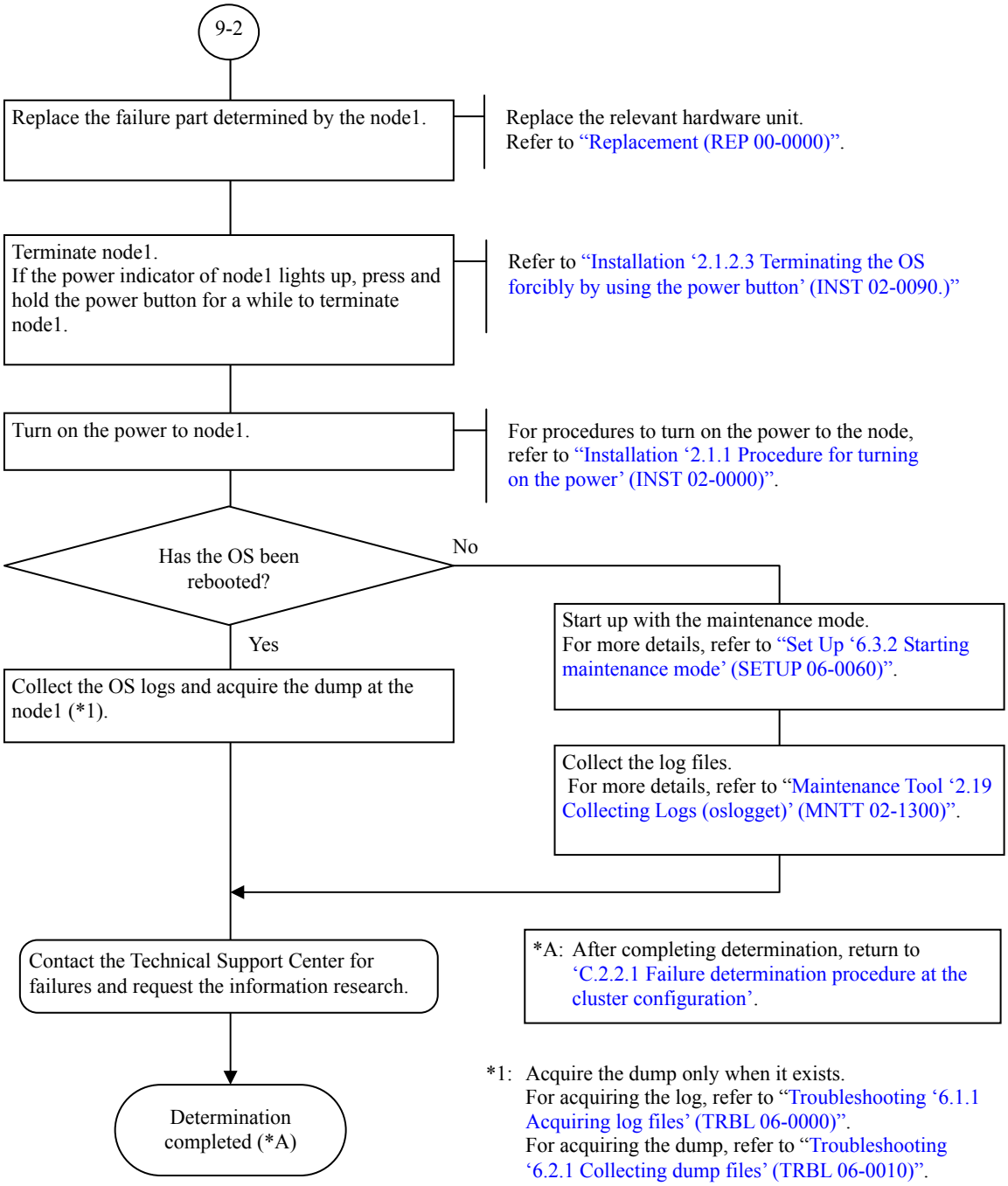

Figure C.2.3.2.2-9 Flow of Management Network Failure Determination (3/6)

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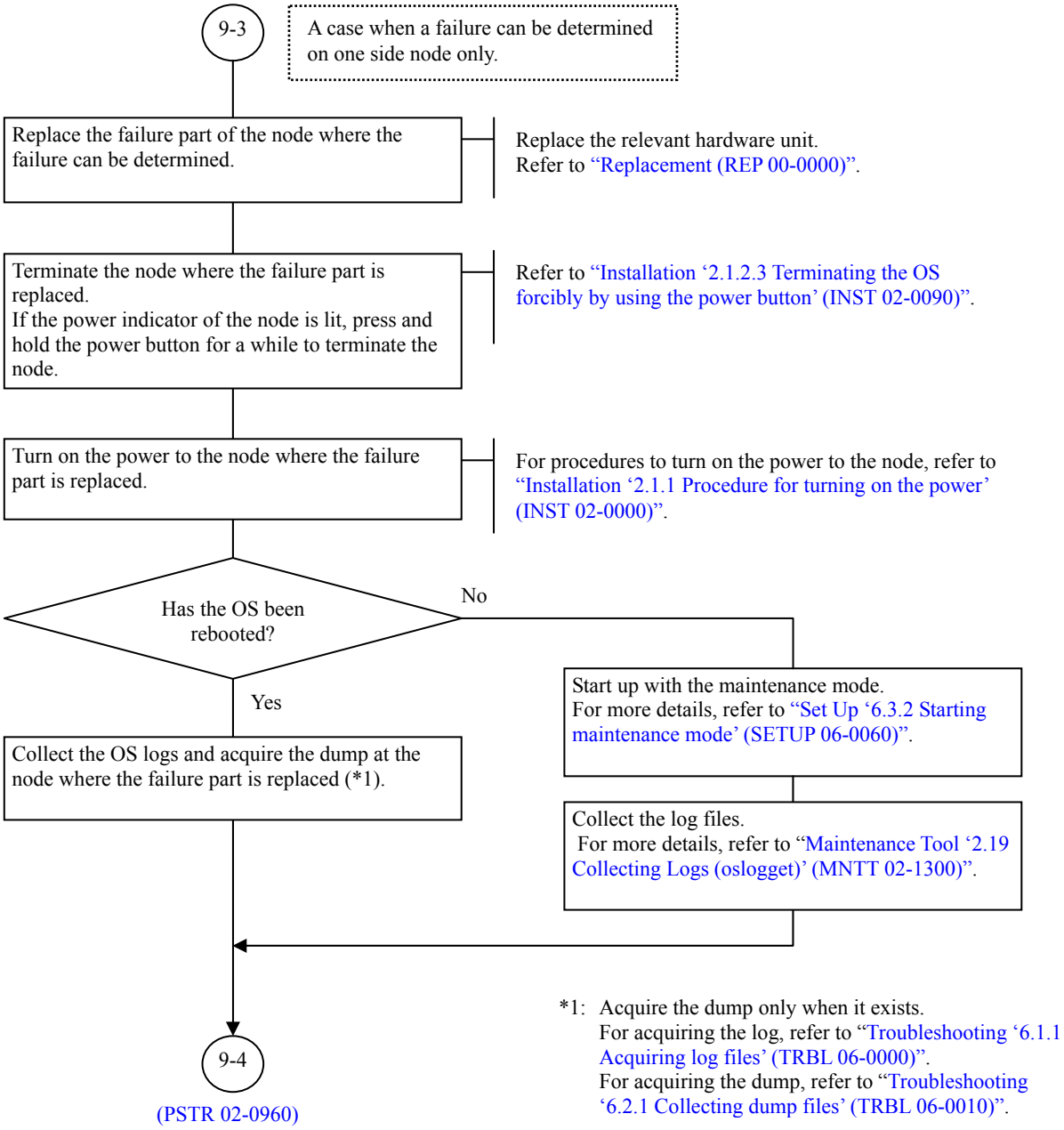

Figure C.2.3.2.2-9 Flow of Management Network Failure Determination (4/6)

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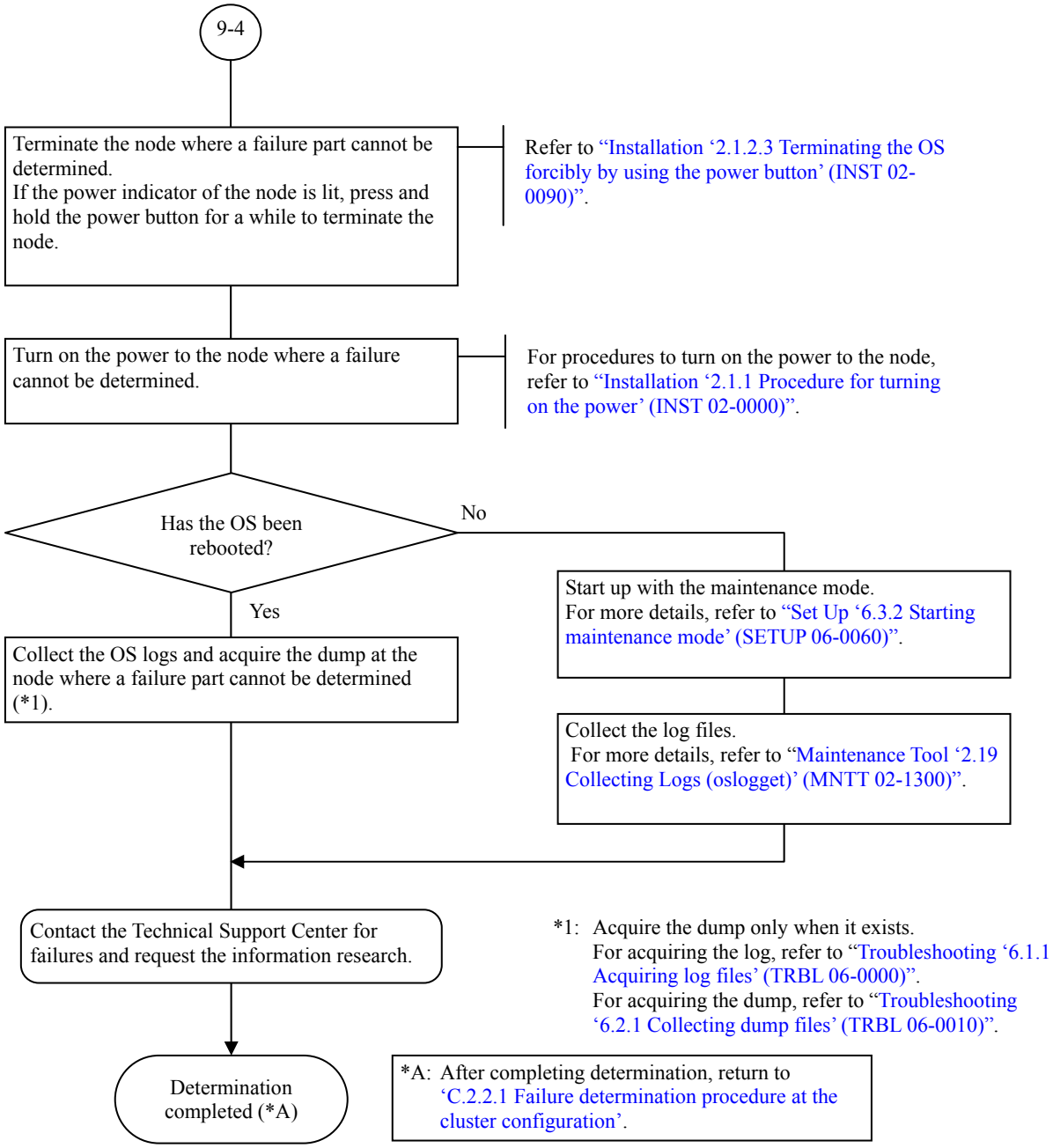

Figure C.2.3.2.2-9 Flow of Management Network Failure Determination (5/6)

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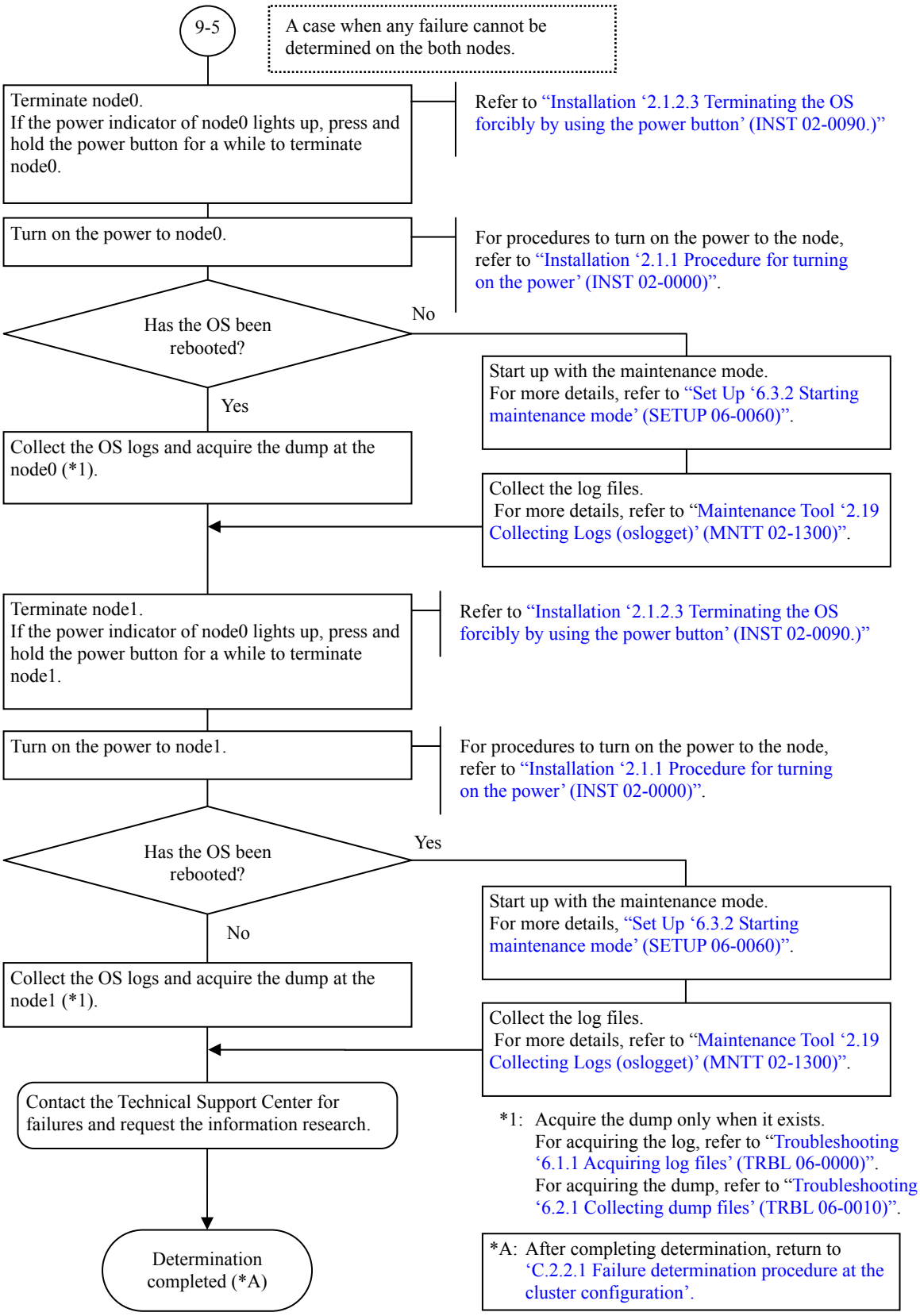

Figure C.2.3.2.2-9 Flow of Management Network Failure Determination (6/6)

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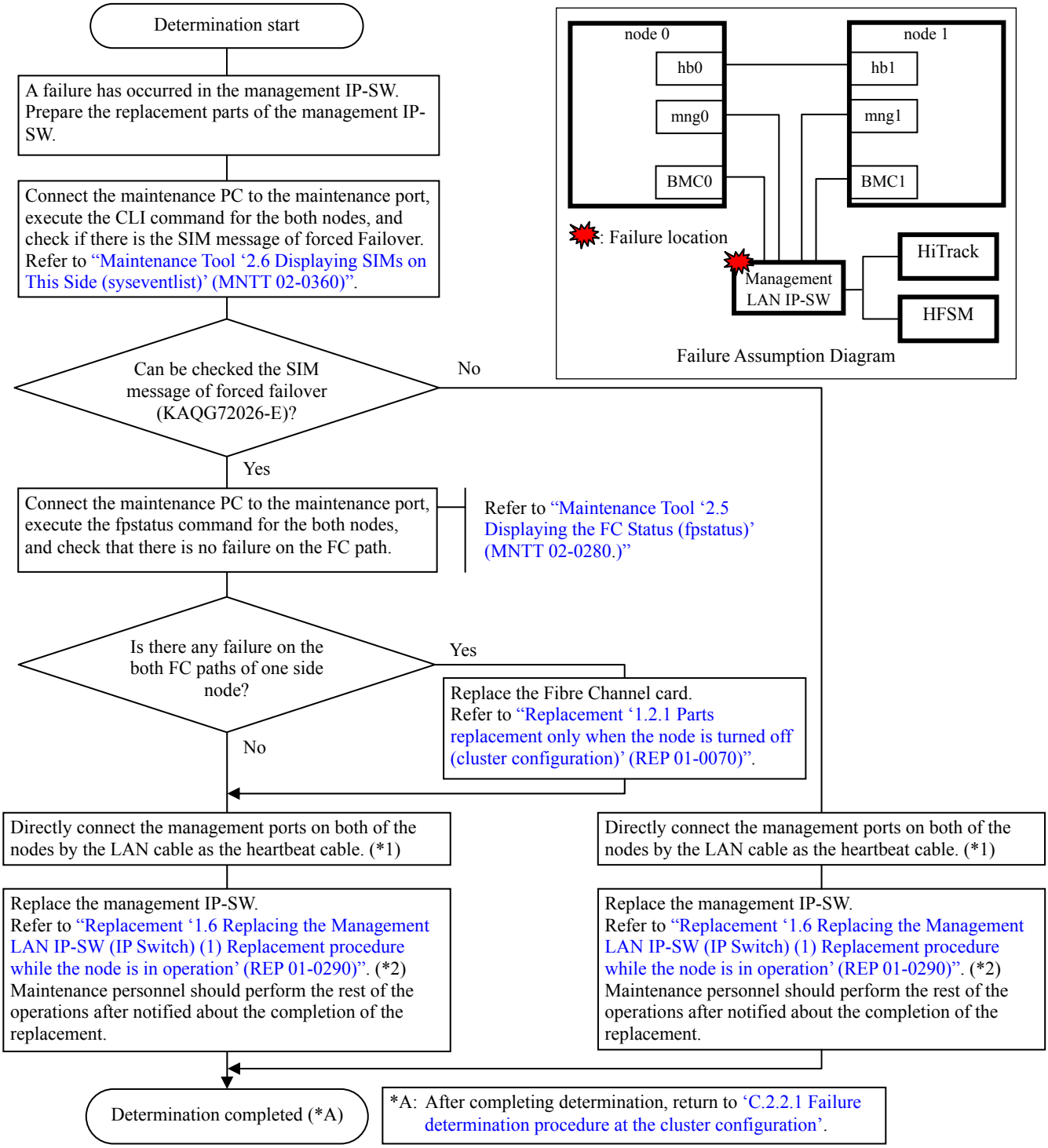
(10) Failure in the management IP-SW



*1: Remove the LAN cable connecting between the management port on the node 0 and the management LAN IP-SW from the management LAN IP-SW, and then connect to the management port on the node 1.

*2: Before executing the procedure (1-3)(c) that is described in the "Replacement '1.6 Replacing the Management LAN IP-SW (1) Replacement procedure while the node is in operation' (REP 01-0290)", the other side node of the node where the SIM message of forced failover is confirmed is reset. After confirming the startup of the other side node, execute the procedure (1-3)(c) and later.

Figure C.2.3.2.2-10 Flow of Management Network Failure Determination

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C.2.3.2.3 Failure determination in case of node outage

Refer to “QuantaGrid Series D51B-2U Technical Guide ‘Troubleshooting’”, and determine a failure on the node in which the OS down, and then return to the procedure described in ‘C.2.3.2.2 Flow of management network failure determination’ to continue the determination operation.

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C.2.3.3 Determining the node failure when no failover occurs

The failure determination and the failed part when SIM of failover is not displayed are described below.

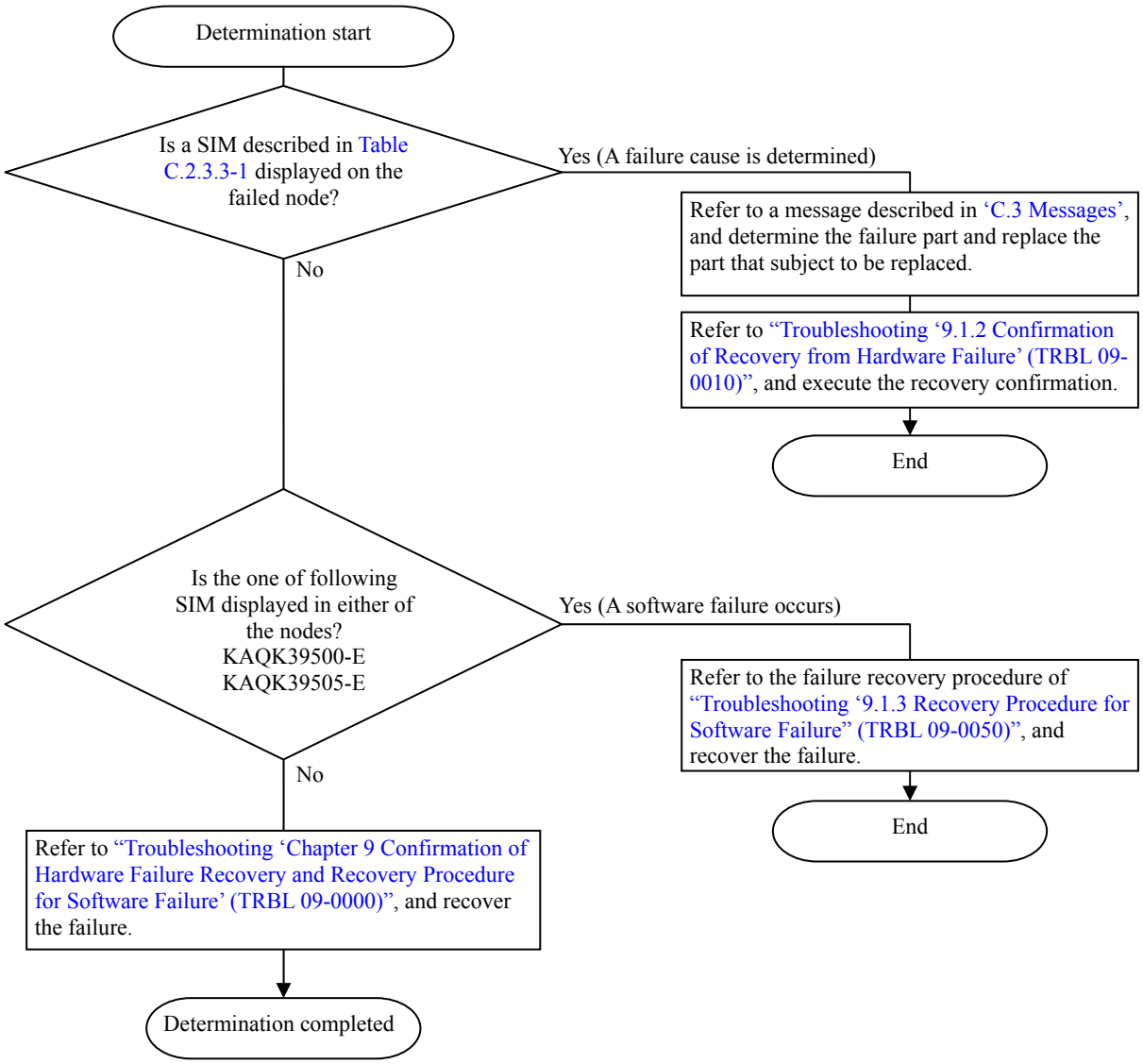

Figure C.2.3.3-1 Determining the node failure when failover has not occurred

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Table C.2.3.3-1 Failed parts shown by SIM

#	SIM	Lamp status	Checking the status by the hwstatus command (*1)	Failed part
1	KAQG72012-W	—	Is the Heartbeat LAN port status “Link down”?	Heartbeat LAN port or Heartbeat LAN cable (*2) (*3)
2	KAQG81003-W	—	Is the port status “Link down”?	Extension NIC port or cable (*2)
3	KAQK31500-E	—	Is the power supply status “failed”?	One power supply unit
4	KAQK32500-E	—	Is the FAN status “failed”?	One FAN
5	KAQK37506-E	LED status that indicates the failed drive (*5)	Is the Internal HDD status “failed”?	One Internal drive
6	KAQK39504-E	—	Is the status of all ports of NIC “Link down”?	—
7	KAQK39527-E	—	—	Pool exhaustion (*4)

*1: For the hwstatus command, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus)’.
*2: When it is not recovered even if the cable is replaced, it is a port failure.
*3: In case of a port failure, ping from the management PC or maintenance PC, and specify which of the nodes has the port failure.
*4: Ask the system administrator to recover the pool exhaustion.
*5: For the LED status of drive, refer to “QuantaGrid Series D51B-2U Technical Guide”.

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C.2.3.4 Determining the node failure when failover occurred

The failure determination and the failed part when SIM of failover is displayed are described.

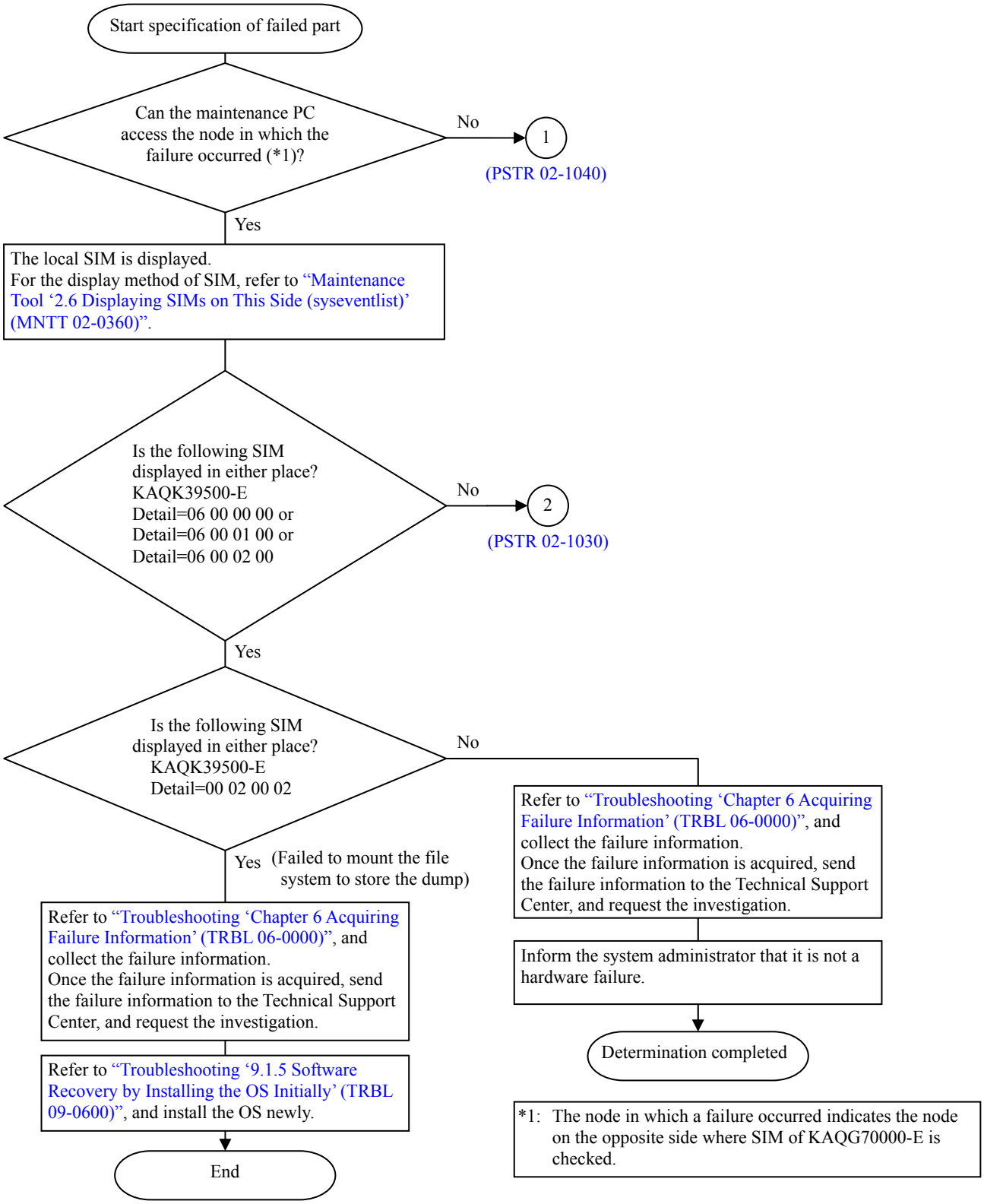

Figure C.2.3.4-1 Determining the node failure when failover occurred (1/5)

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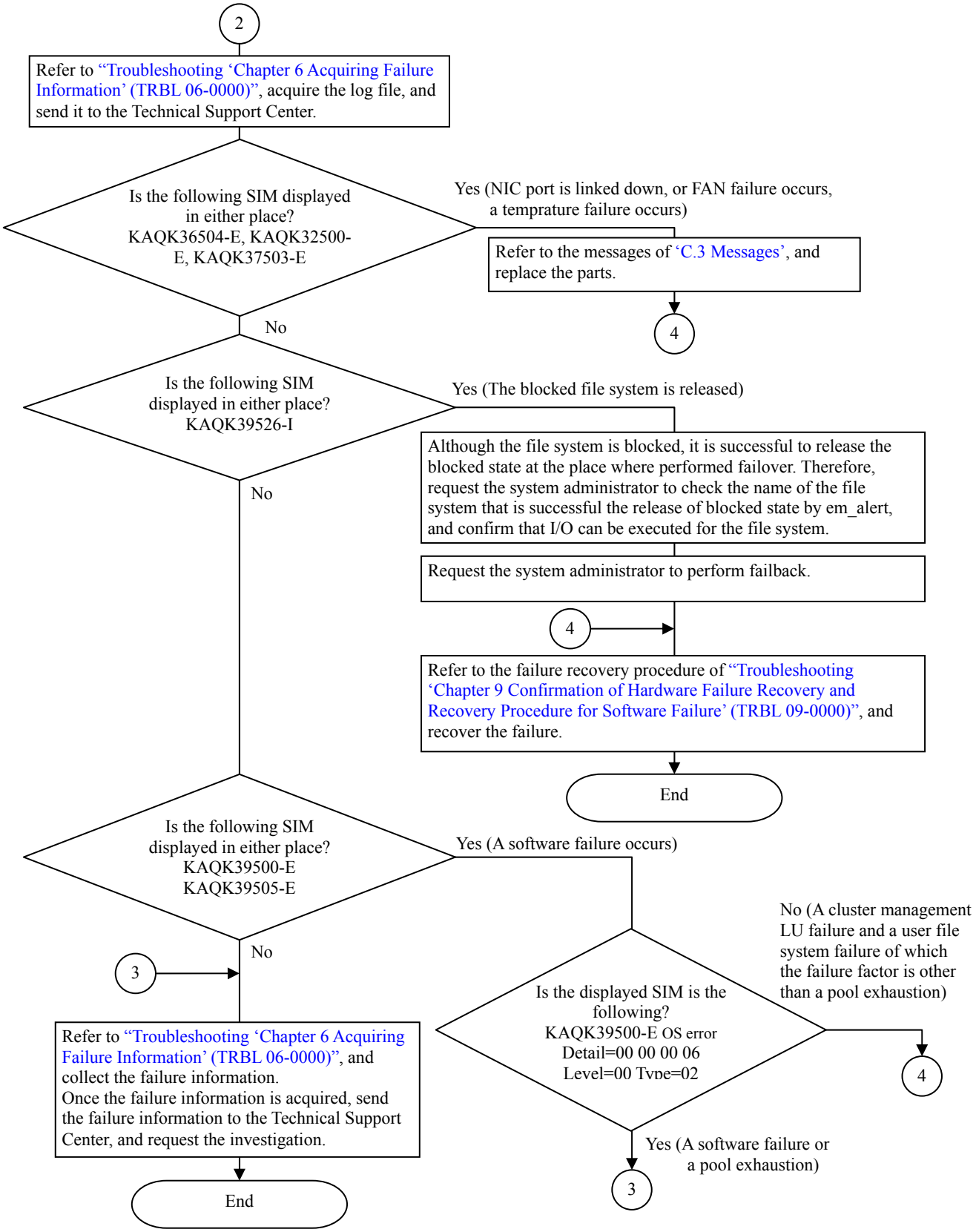

Figure C.2.3.4-1 Determining the node failure when failover occurred (2/5)

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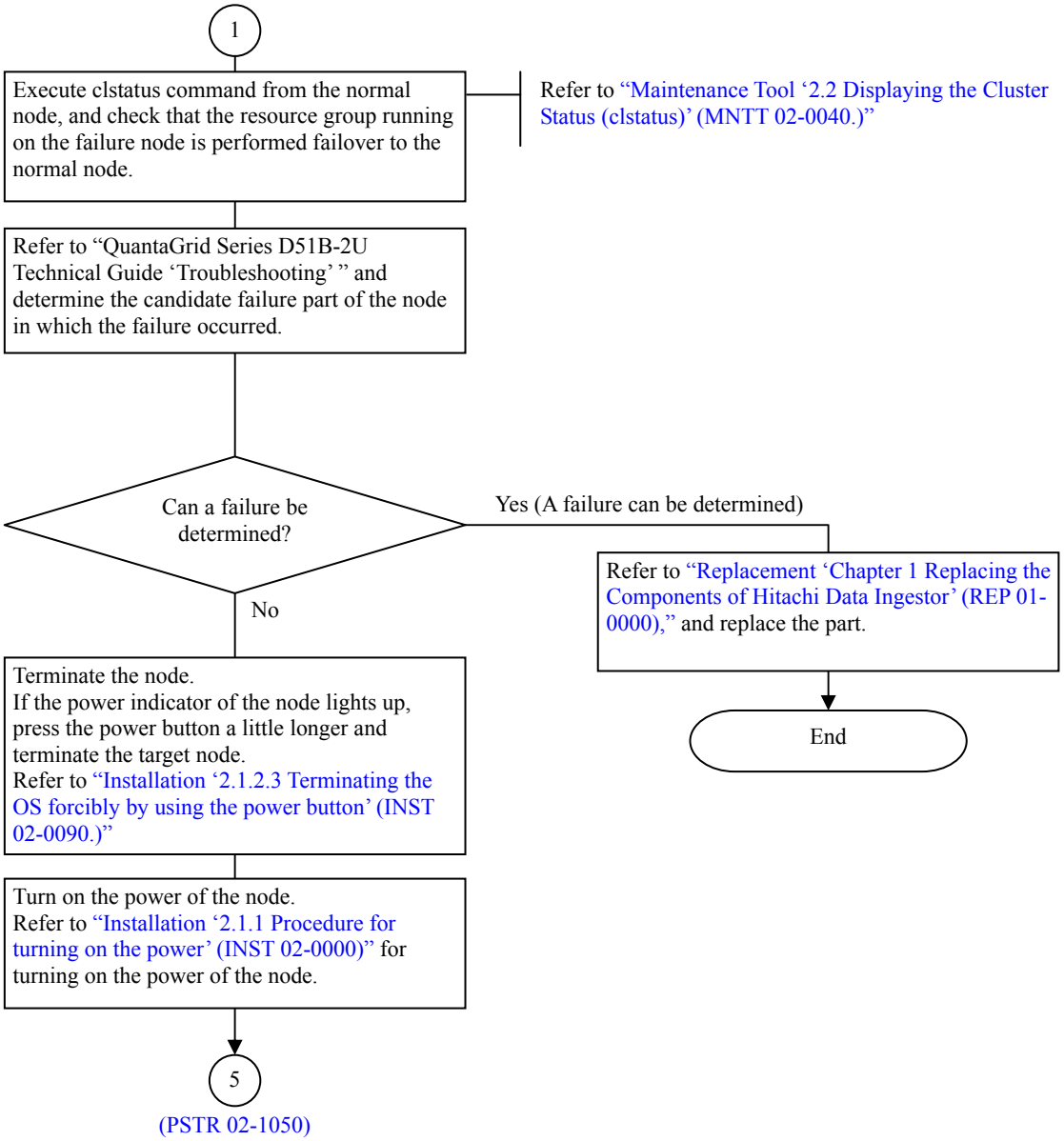

Figure C.2.3.4-1 Determining the node failure when failover occurred (3/5)

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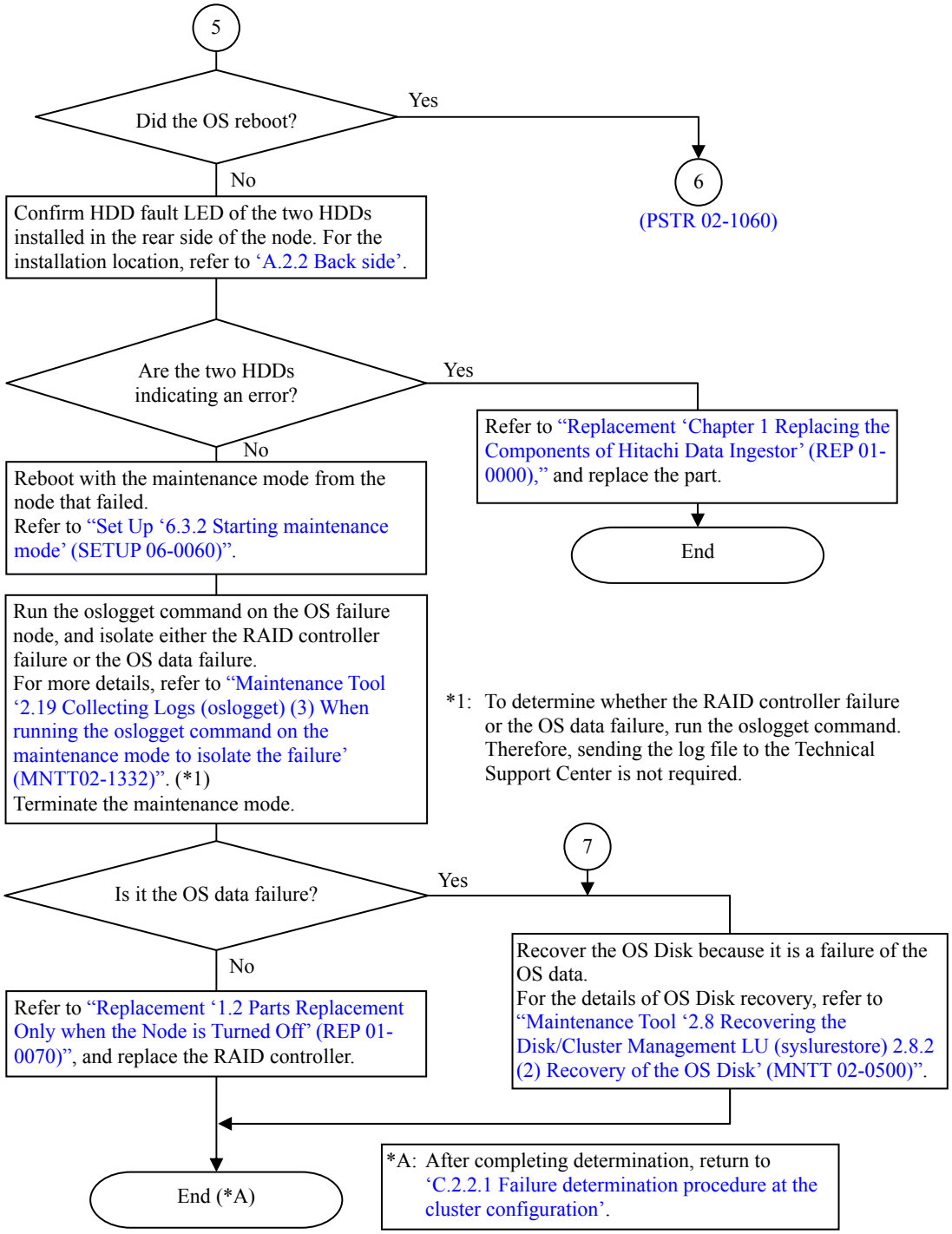

Figure C.2.3.4-1 Determining the node failure when failover occurred (4/5)

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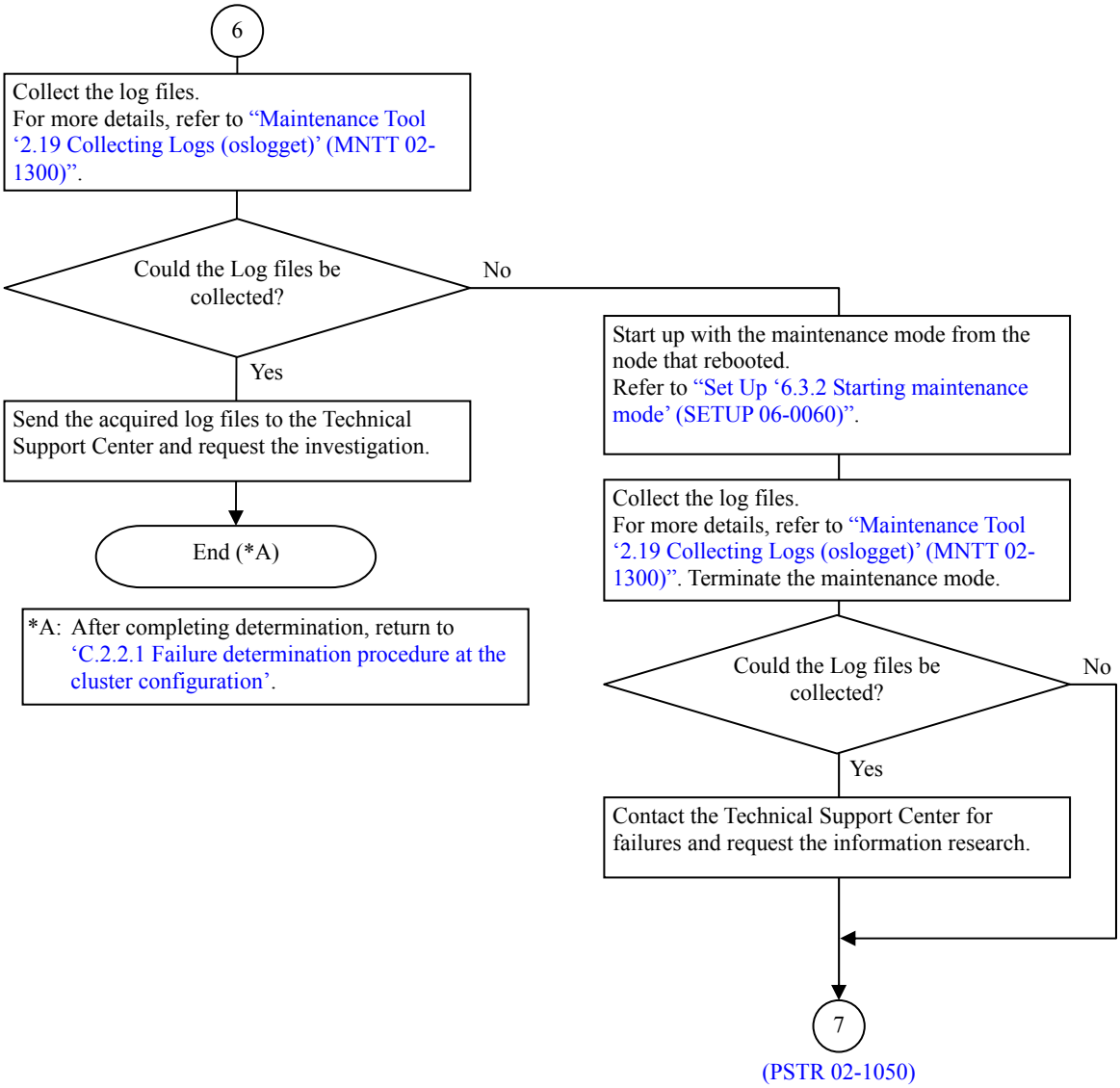

Figure C.2.3.4-1 Determining the node failure when failover occurred (5/5)

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C.2.3.5 Determination of node failure in the single node configuration

The following explains the failure determination and the failure part in the single node configuration.

Table C.2.3.5-1 Table of Determination matrix of the node operating status

Ping for the BMC port (*1)	OS starts up confirmation (*2)	ssh login for the maintenance port (*3)	Result of the determination
Y	Y	Y	node in operation
		N	node in operation (Maintenance port failure)
	N	—	node down
N	—	Y	node in operation (BMC failure)
		N	Ask the system administrator if the data can be accessed.

*1: Connect directly the BMC port to the maintenance PC with a LAN cable, and execute ping command for the BMC port.

*2: Check if the OS starts from the remote console of BMC. For the details, refer to "Set Up '1.4 Connection Confirmation of the Remote Console' (SETUP 01-0010)".

*3: Connect directly the maintenance port to the maintenance PC with a LAN cable, and check if the ssh login can be done. For the details, refer to "Maintenance Tool '1.3 Procedures for Operating Commands' (MNTT 01-0200)".

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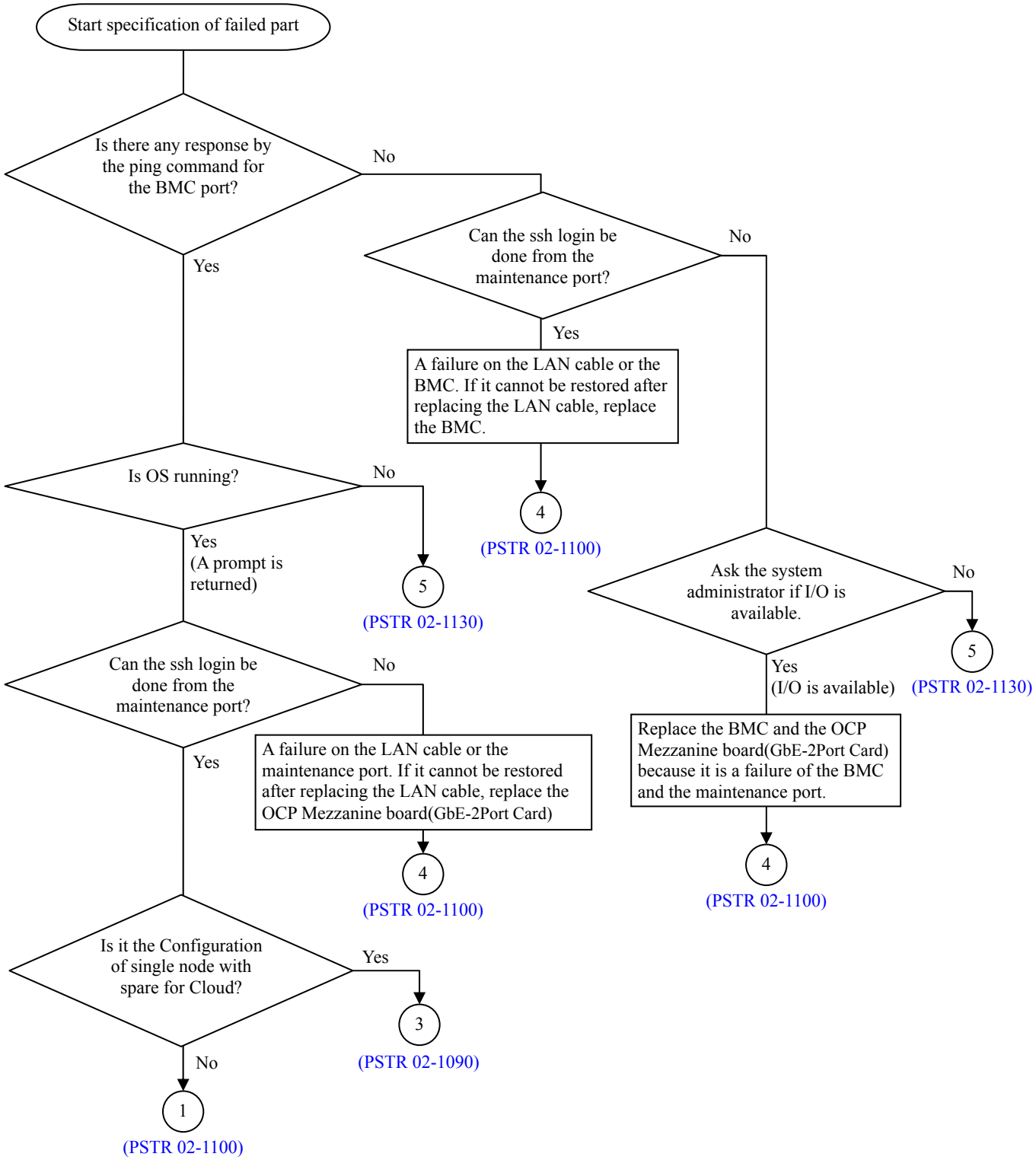

Figure C.2.3.5-1 Determining the node failure in the single node configuration (1/9)

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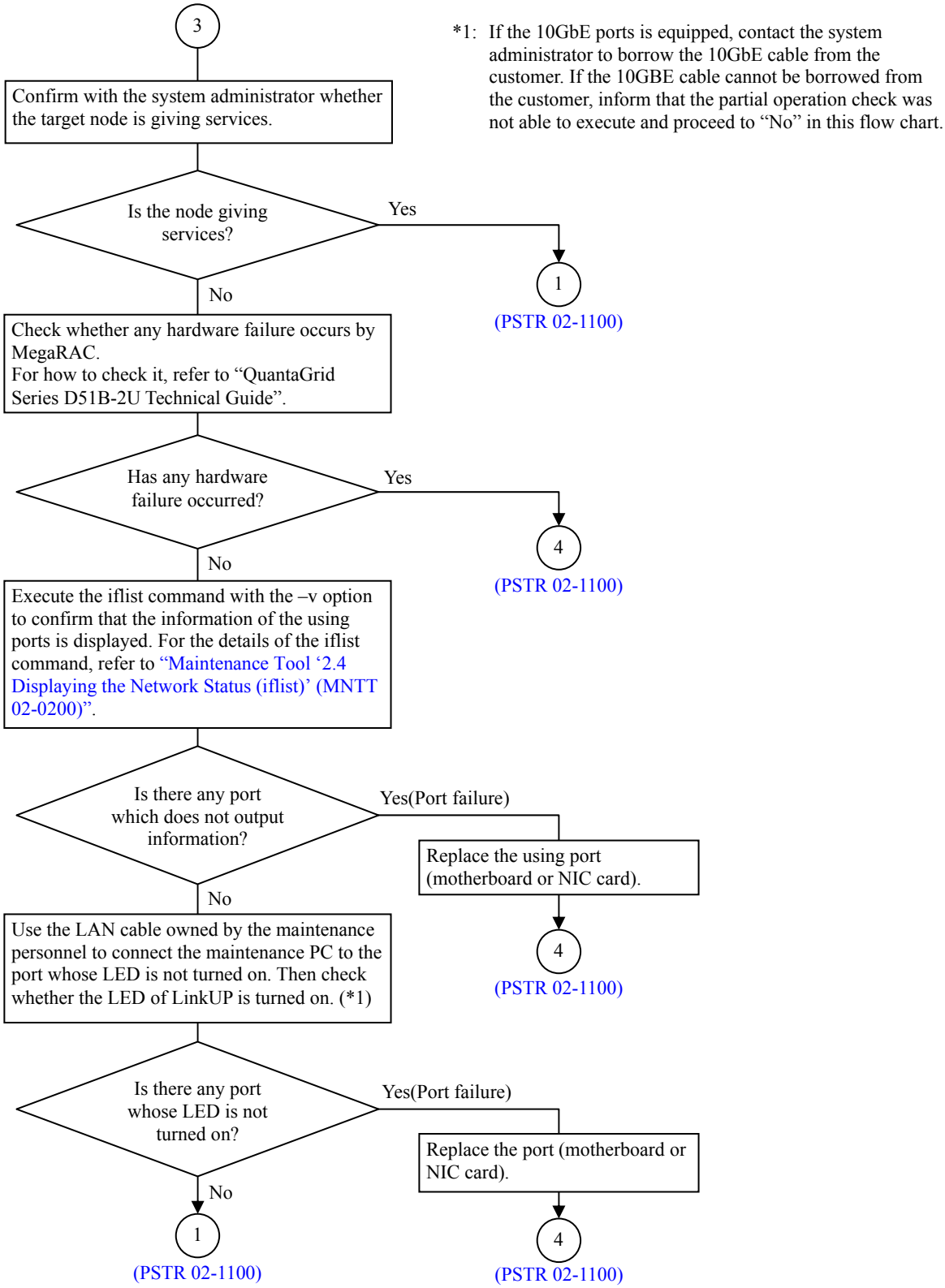

Figure C.2.3.5-1 Determining the node failure in the single node configuration (2/9)

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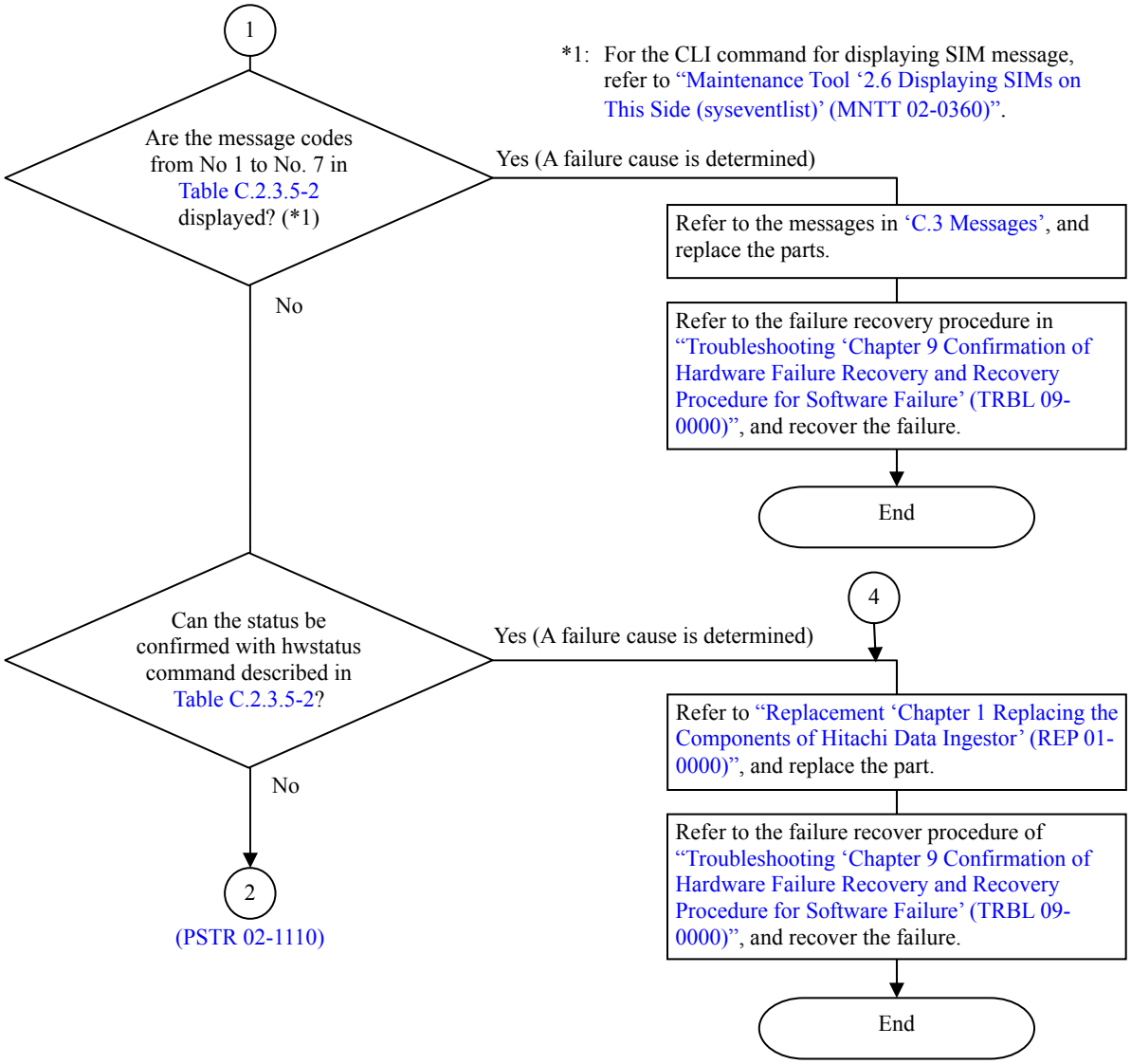

Figure C.2.3.5-1 Determining the node failure in the single node configuration (3/9)

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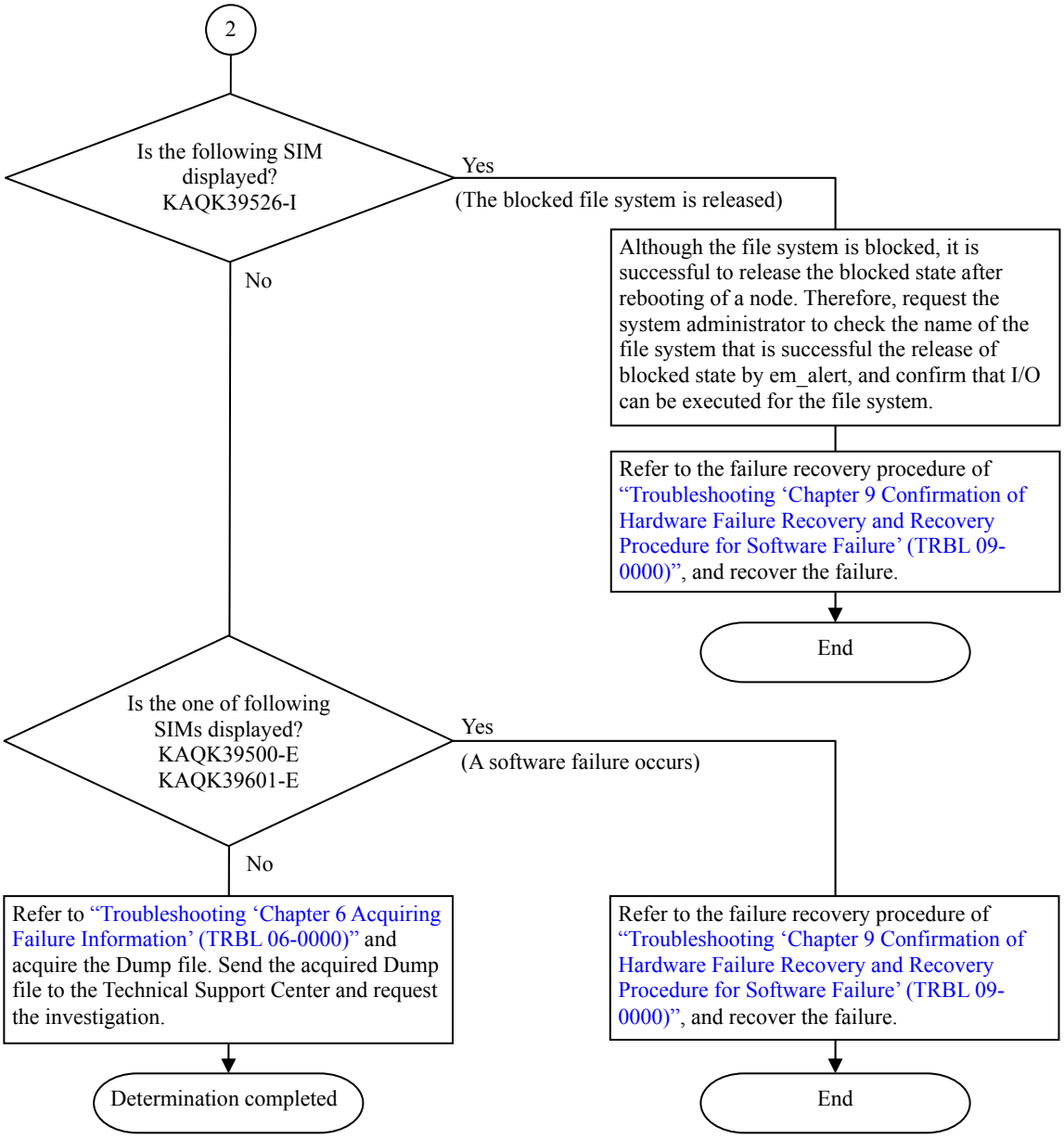

Figure C.2.3.5-1 Determining the node failure in the single node configuration (4/9)

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Table C.2.3.5-2 Failed parts shown by SIM or LCD

#	SIM	Checking the status by the hwstatus command (*1)	Failed part
1	KAQG81003-W	Is the port status “Link down”? (*3)	On-board port, Extension NIC port, or cables (*2)
2	KAQK31500-E	Is the PSU status “failed”?	One PSU
3	KAQK32500-E	Is the FAN status “failed”?	One FAN
4	KAQK37506-E	Is the Internal HDD status “failed”?	One Internal drive
5	KAQK39504-E	Are the statuses of all ports of NIC “Link down”? (*3)	—
6	KAQK36504-W	Is the statuses of the port “Link down”? (*3)	A port or a cable described in the SIM.
7	KAQK37525-E	—	RAID card
8	—	Is the status of BMC “Unknown!”?	BMC

*1: For the hwstatus command, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus)’.
*2: When it is not recovered even if the cable is replaced, it is a port failure.
*3: If the node is a Configuration of single node with spare for Cloud and has not been giving services, SIM is output as a LAN cable is intentionally unplugged. In this case, proceed to “No” in the flow chart.

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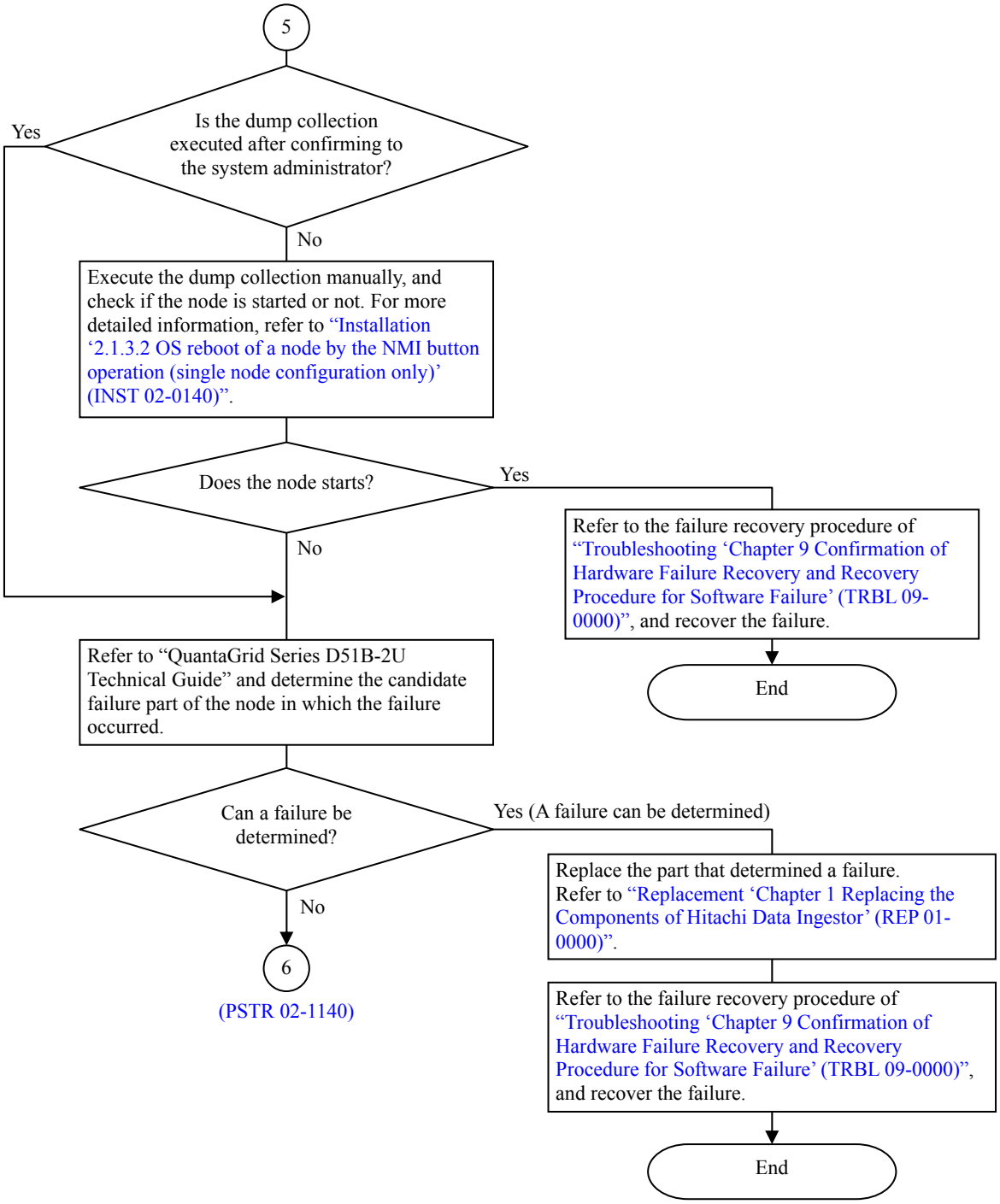

Figure C.2.3.5-1 Determining the node failure in the single node configuration (5/9)

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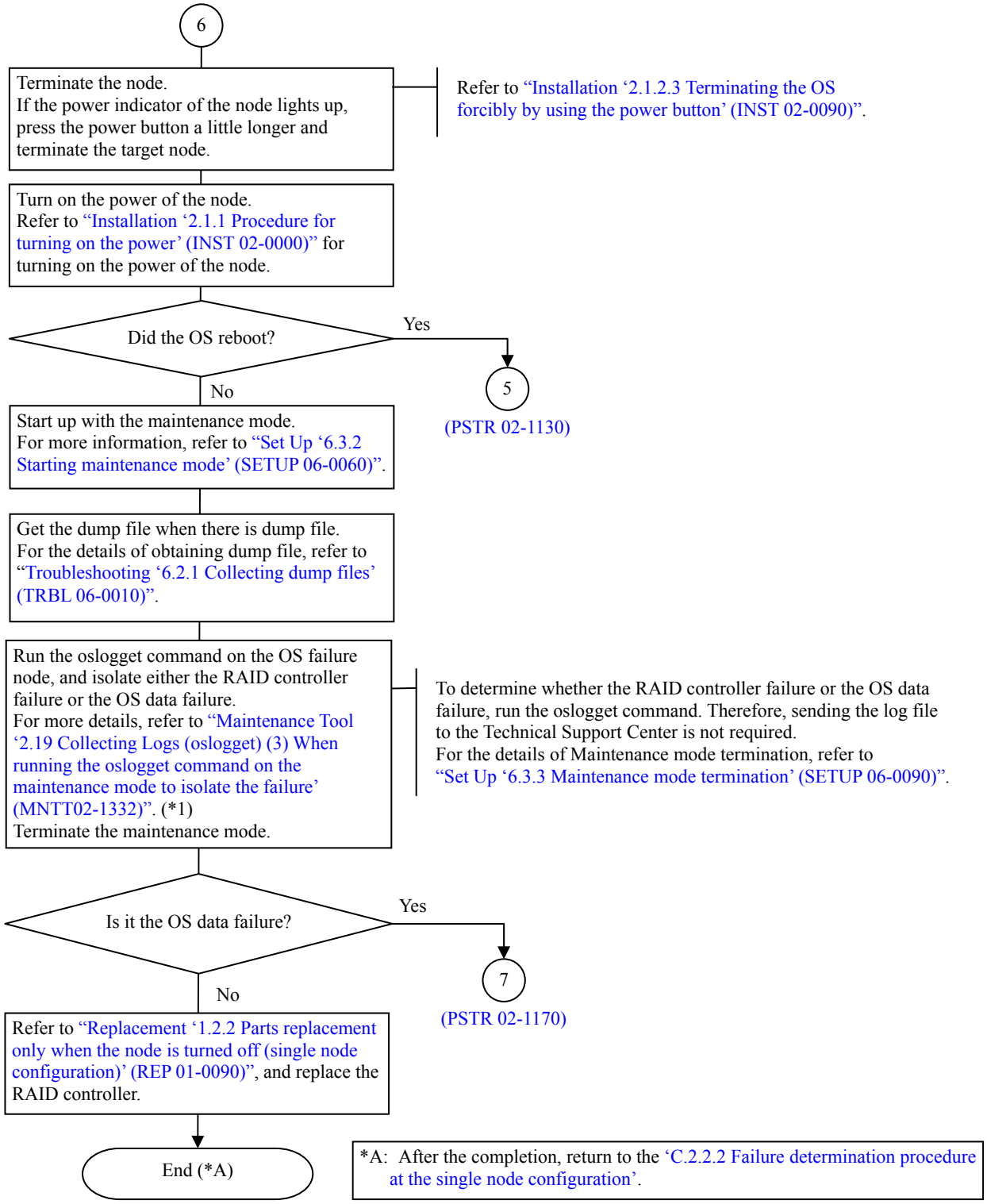

Figure C.2.3.5-1 Determining the node failure in the single node configuration (6/9)

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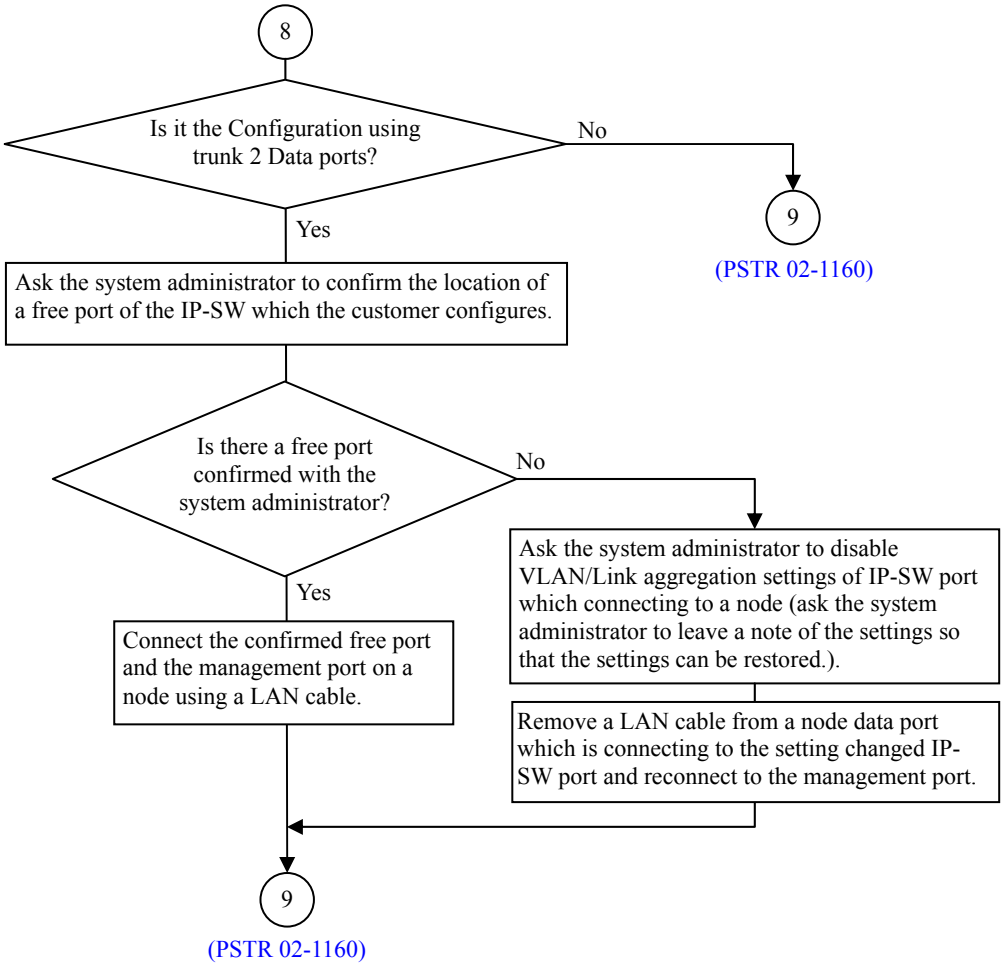

Figure C.2.3.5-1 Determining the node failure in the single node configuration (7/9)

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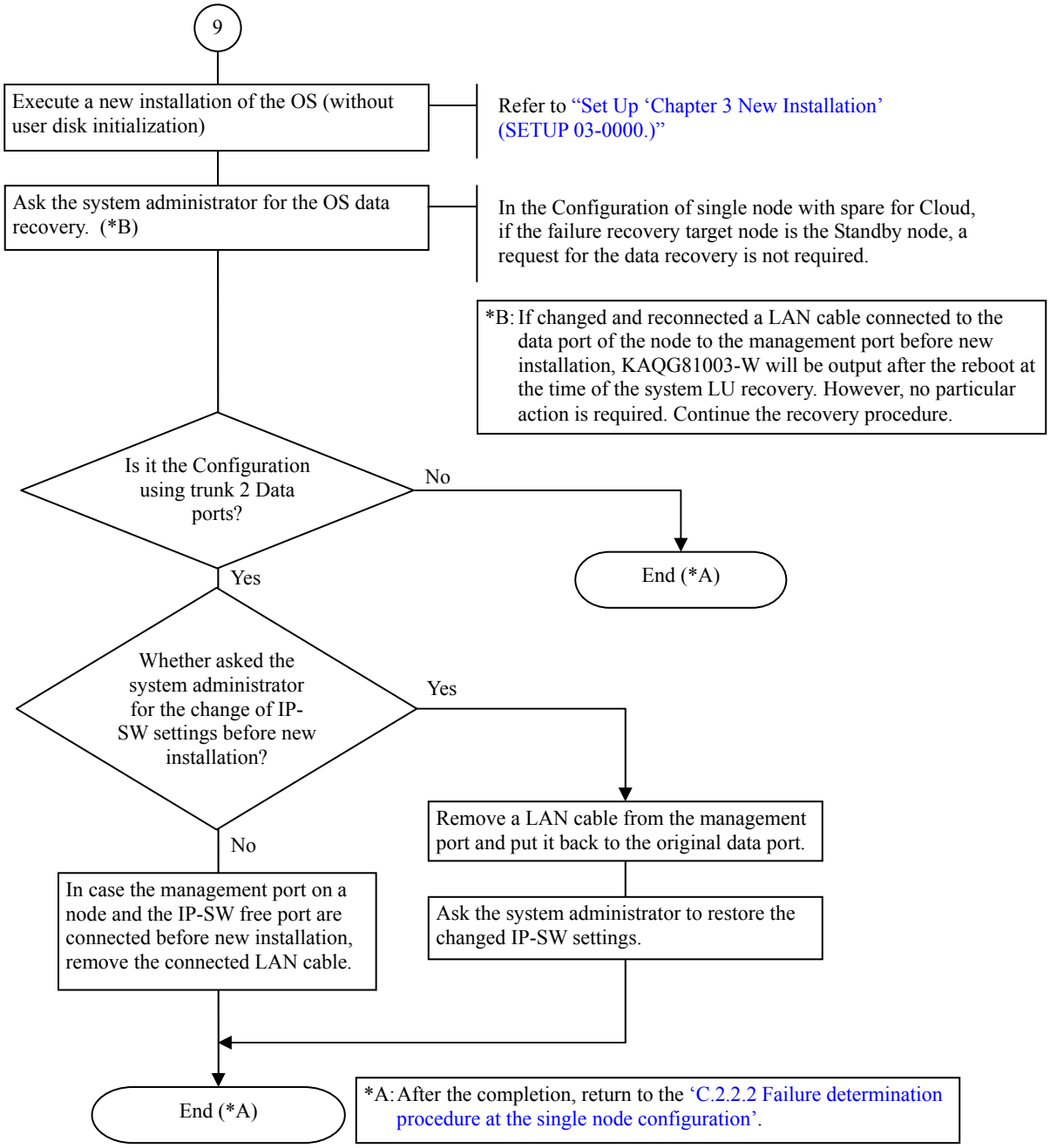

Figure C.2.3.5-1 Determining the node failure in the single node configuration (8/9)

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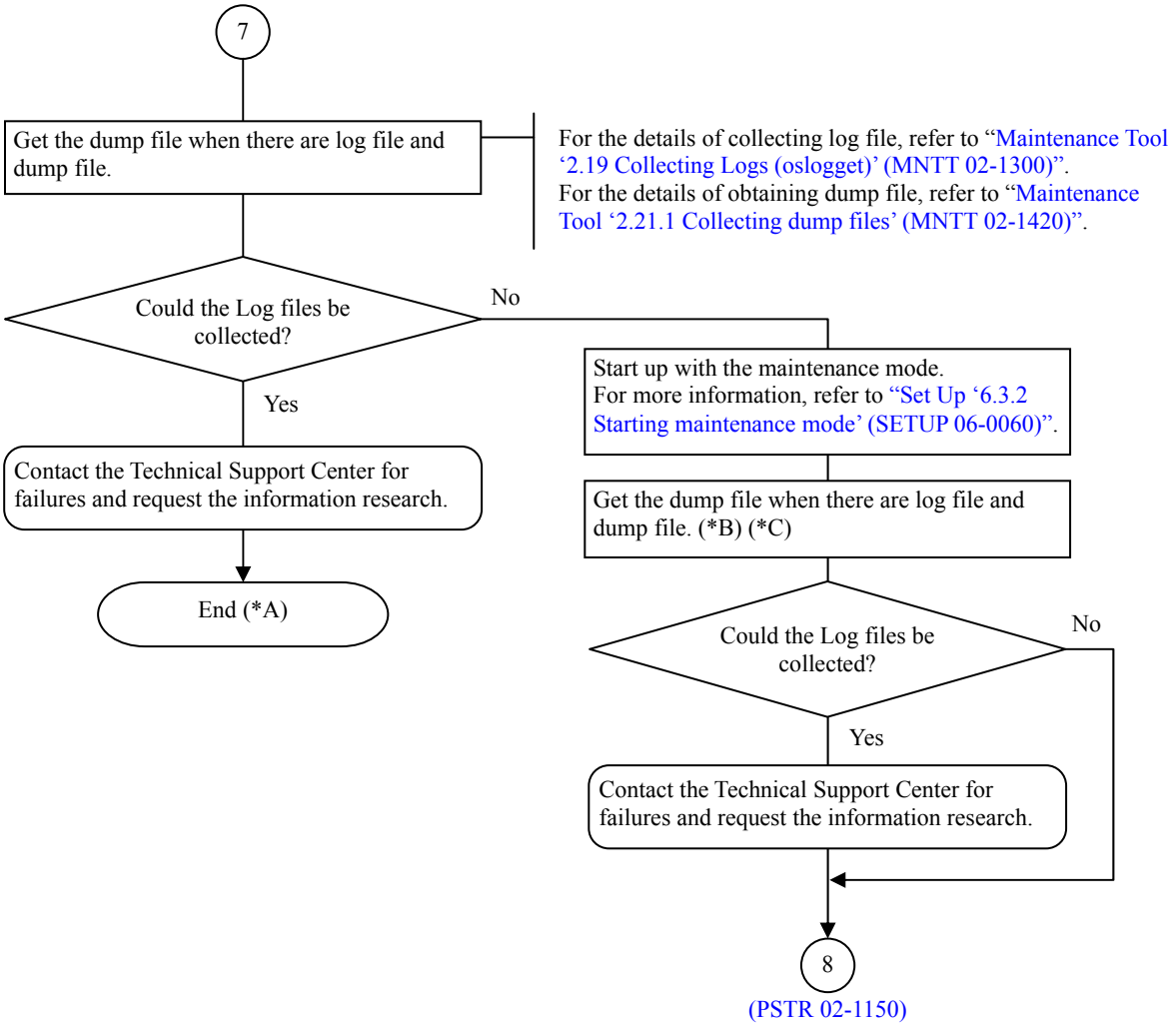

*A: After the completion, return to the 'C.2.2.2 Failure determination procedure at the single node configuration'.
*B: For the details of collecting log file, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".
For the details of obtaining dump file, refer to "Maintenance Tool '2.21.3 Confirm the existence of unconverted dump file (dumpcheck)' (MNTT 02-1461)".
*C: For the details of Maintenance mode termination, refer to "Set Up '6.3.3 Maintenance mode termination' (SETUP 06-0090)".

Figure C.2.3.5-1 Determining the node failure in the single node configuration (9/9)

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C.2.3.6 Determination of network failure

This section shows troubleshooting of SIM message from which it is difficult to determine a failure part in the case of displaying SIM about the network failure.

(1) In the case of the KAQG72012-W

Describe troubleshooting procedure as follow in the case of the “KAQG72012-W Communication via the main heartbeat cable was interrupted.” was displayed.

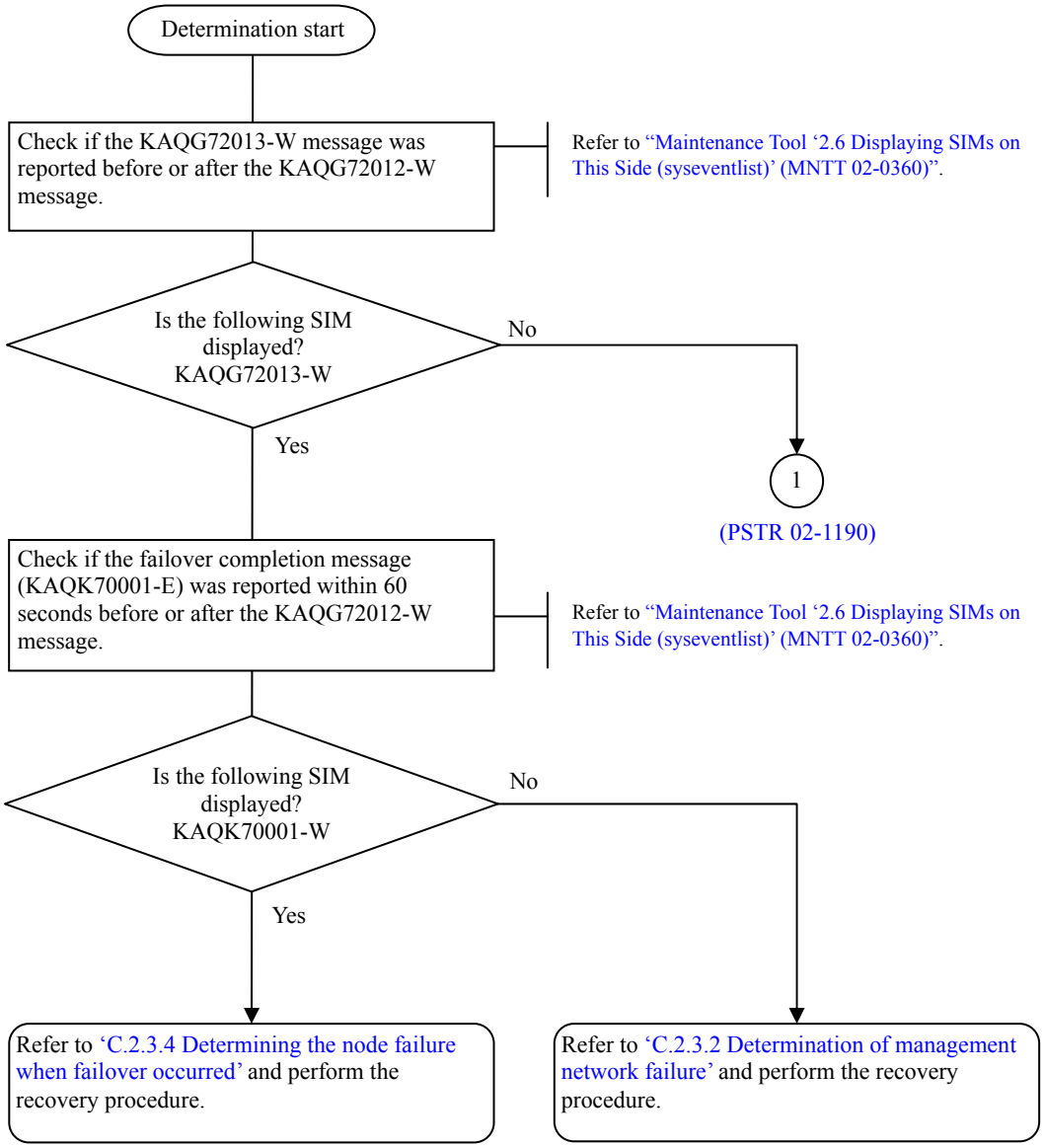

Figure C.2.3.6-1 Determination of network failure (KAQG72012-W) (1/2)

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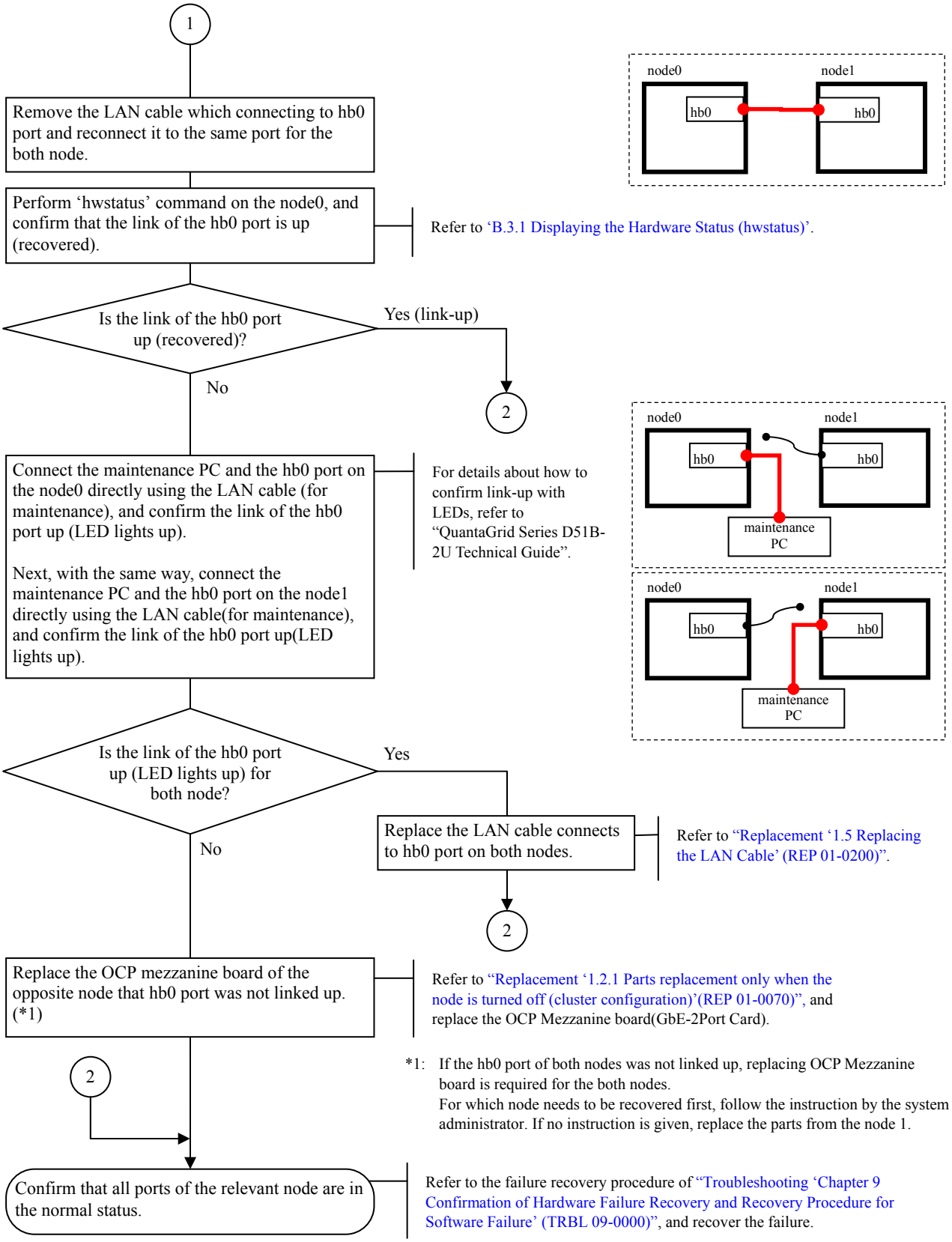

Figure C.2.3.6-1 Determination of network failure (KAQG72012-W) (2/2)

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(2) In the case of the KAQG81003-W

Describe troubleshooting procedure as follow in the case of the "KAQG81003-W Trunking driver: One or more subdevices are down. <*master-device-name*>:<*subdevice-name*>,<*subdevice-name*>…" was displayed.

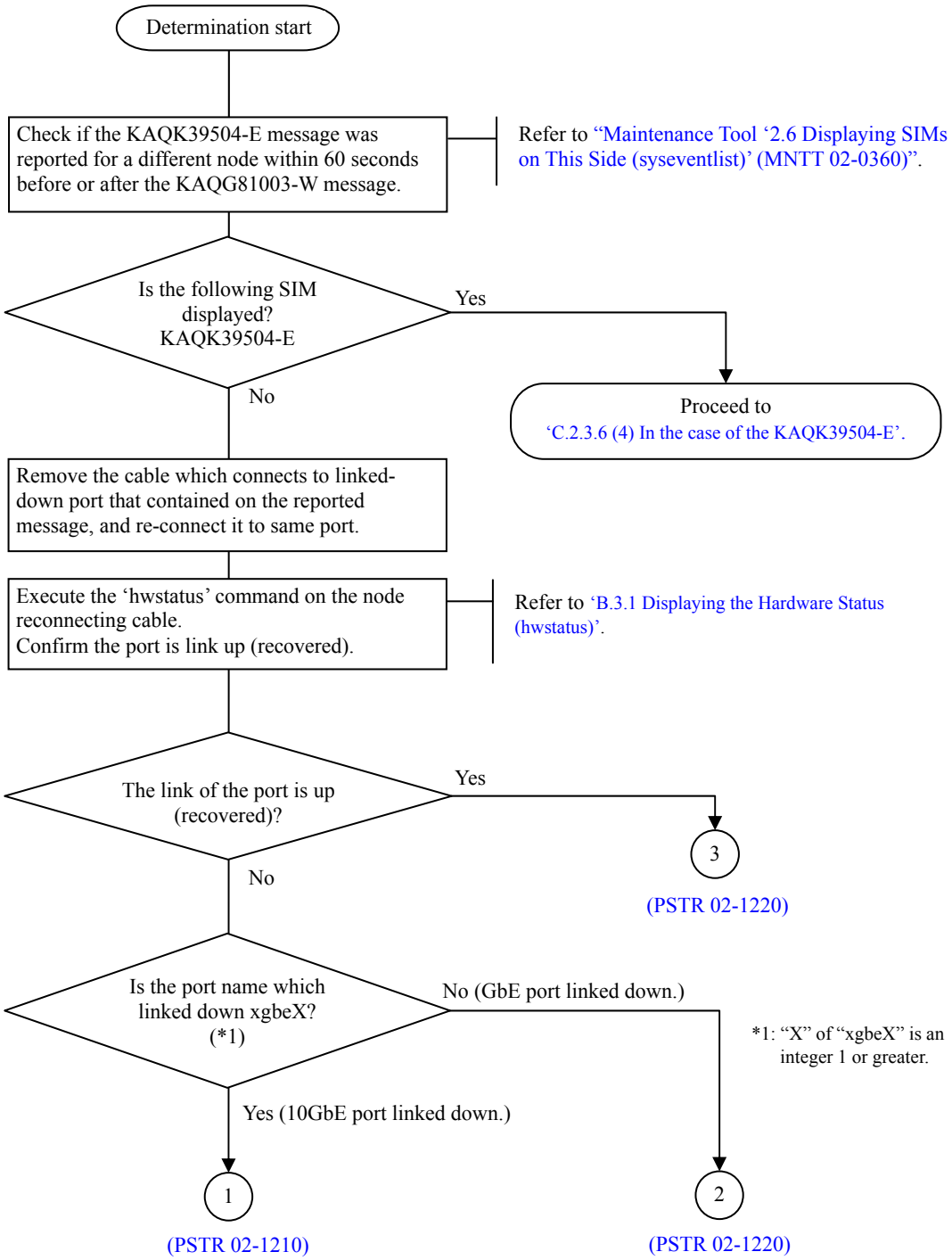

Figure C.2.3.6-2 Determination of network failure (KAQG81003-W) (1/3)

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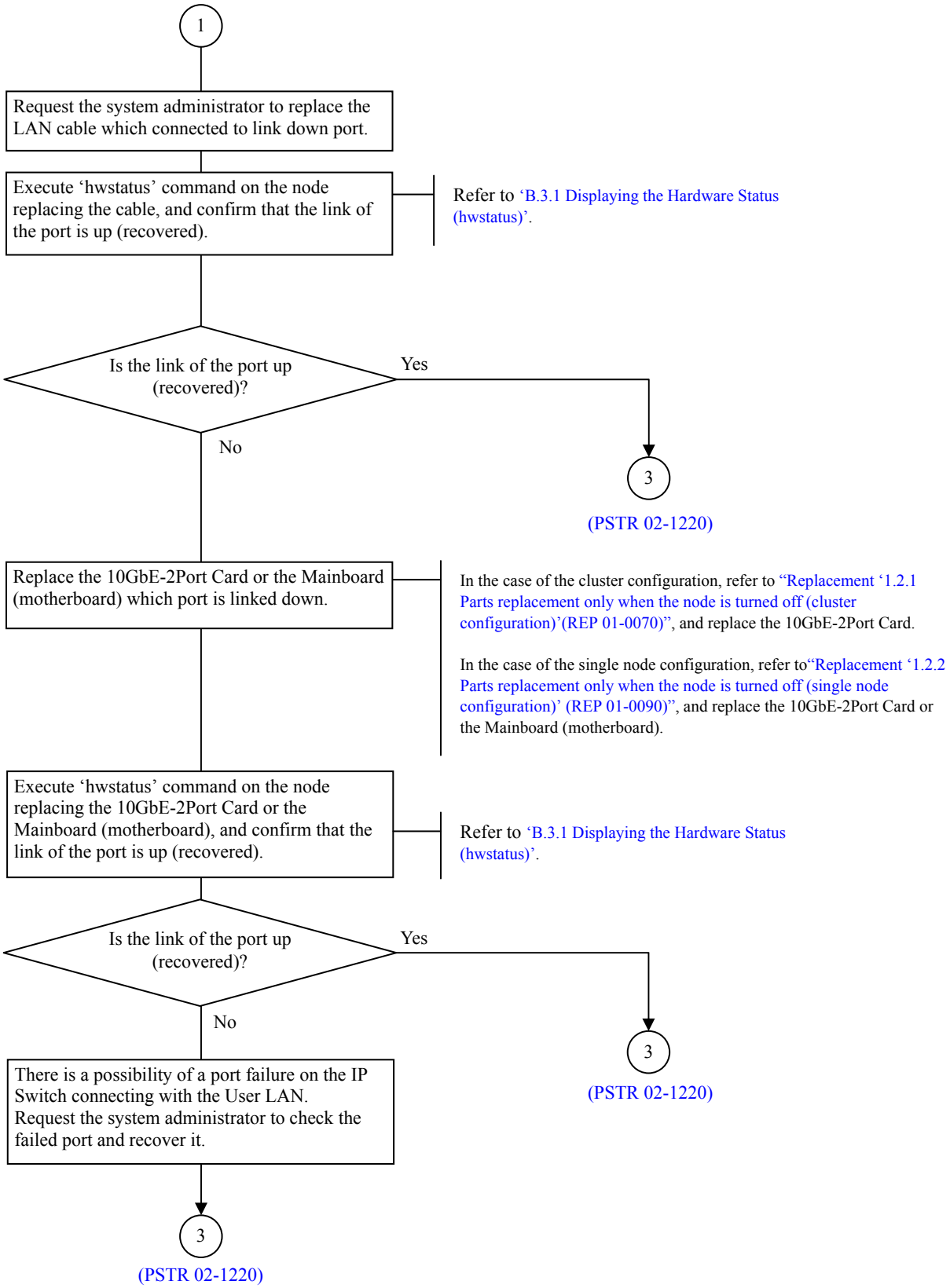

Figure C.2.3.6-2 Determination of network failure (KAQG81003-W) (2/3)

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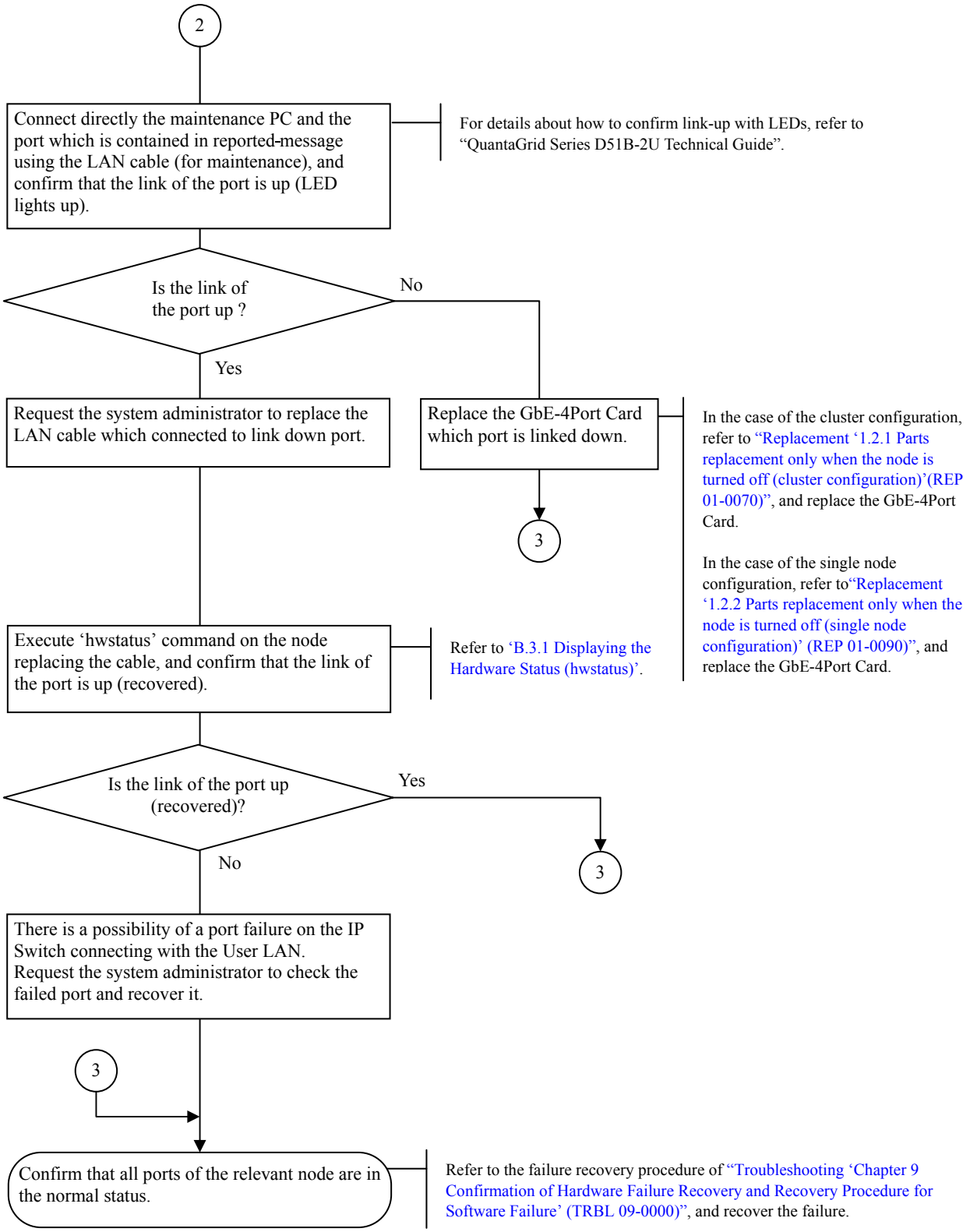

Figure C.2.3.6-2 Determination of network failure (KAQG81003-W) (3/3)

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(3) In the case of the KAQK36504-W

Describe troubleshooting procedure as follow in the case of the "KAQK36504-W NIC: Link down detected(<*interface-name*>)" was displayed.

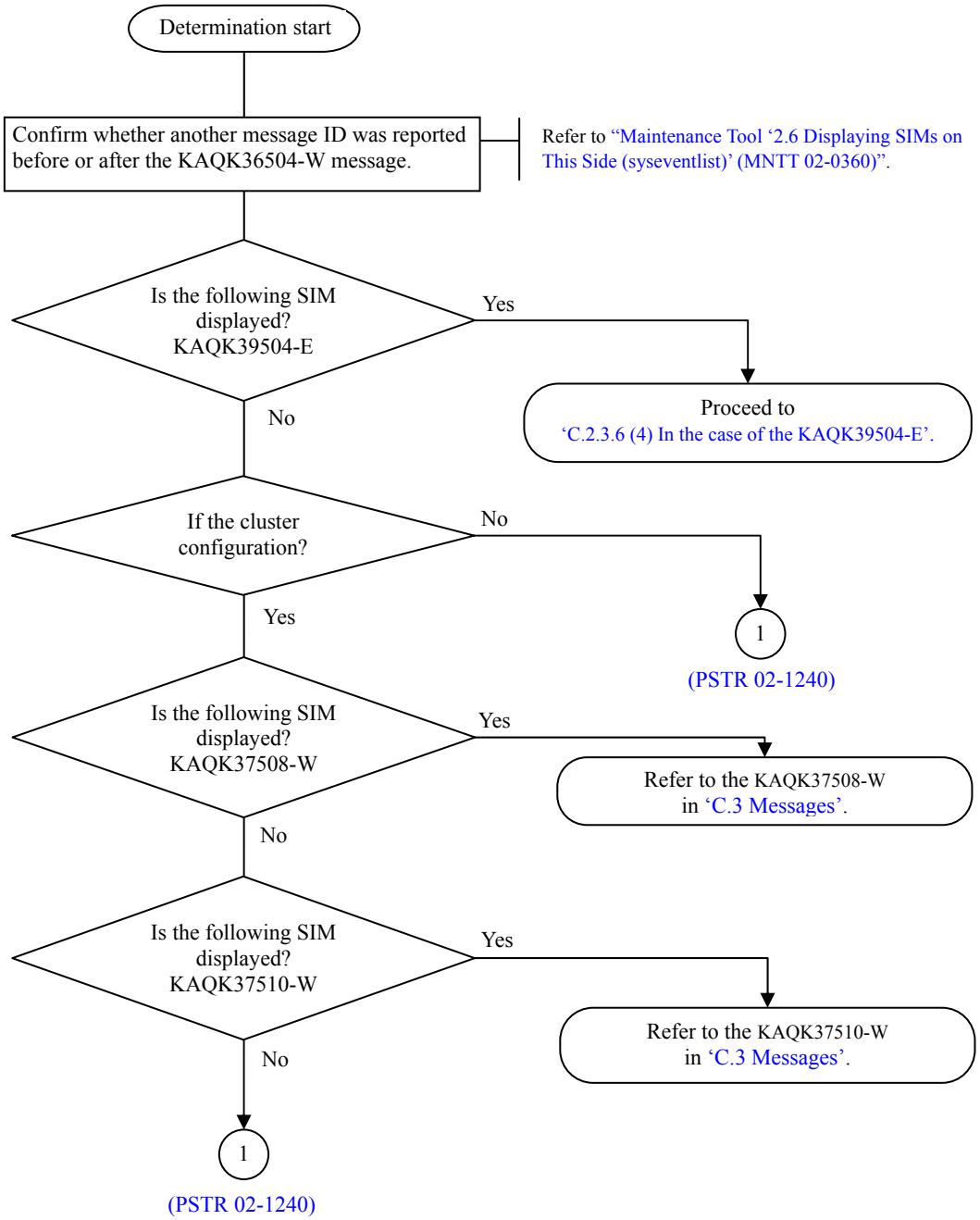

Figure C.2.3.6-3 Determination of network failure (KAQK36504-W) (1/4)

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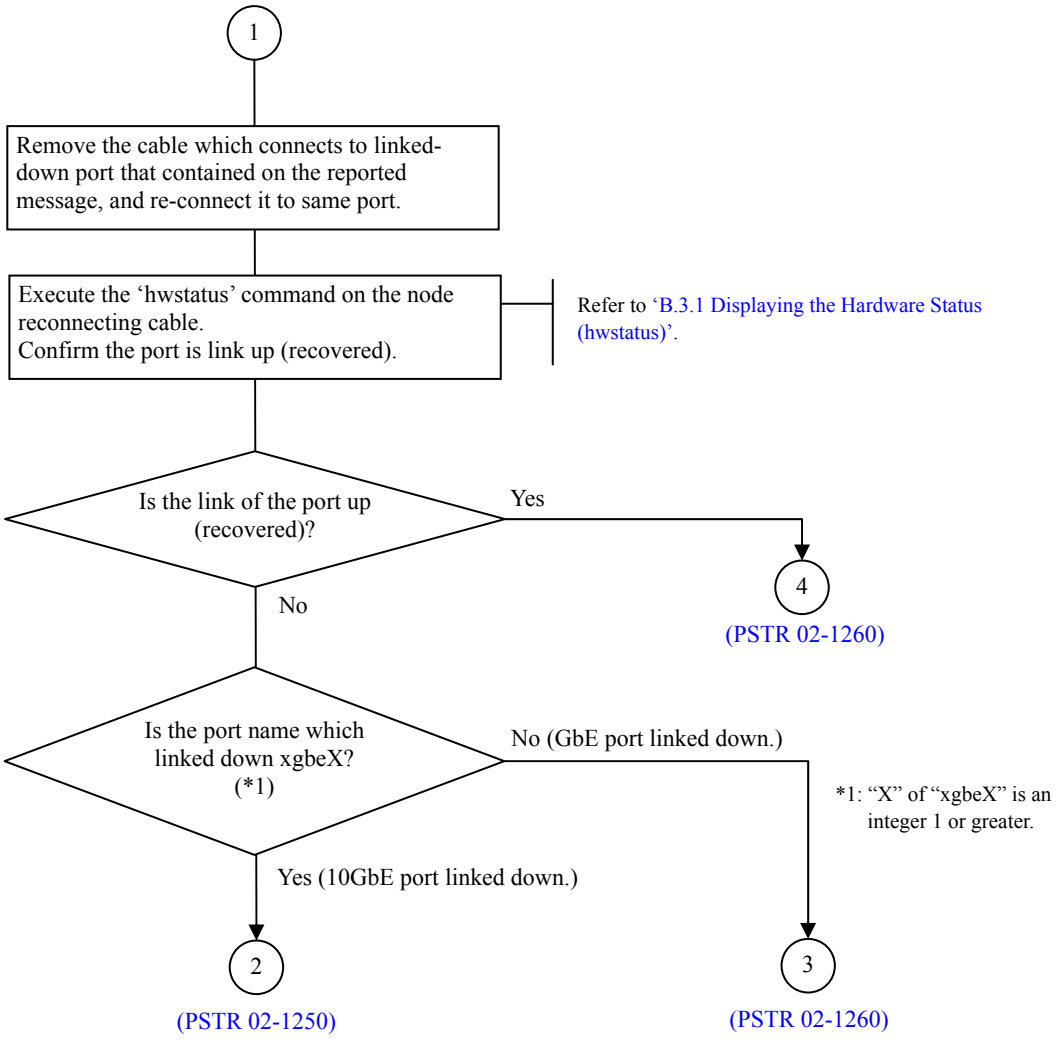

Figure C.2.3.6-3 Determination of network failure (KAQK36504-W) (2/4)

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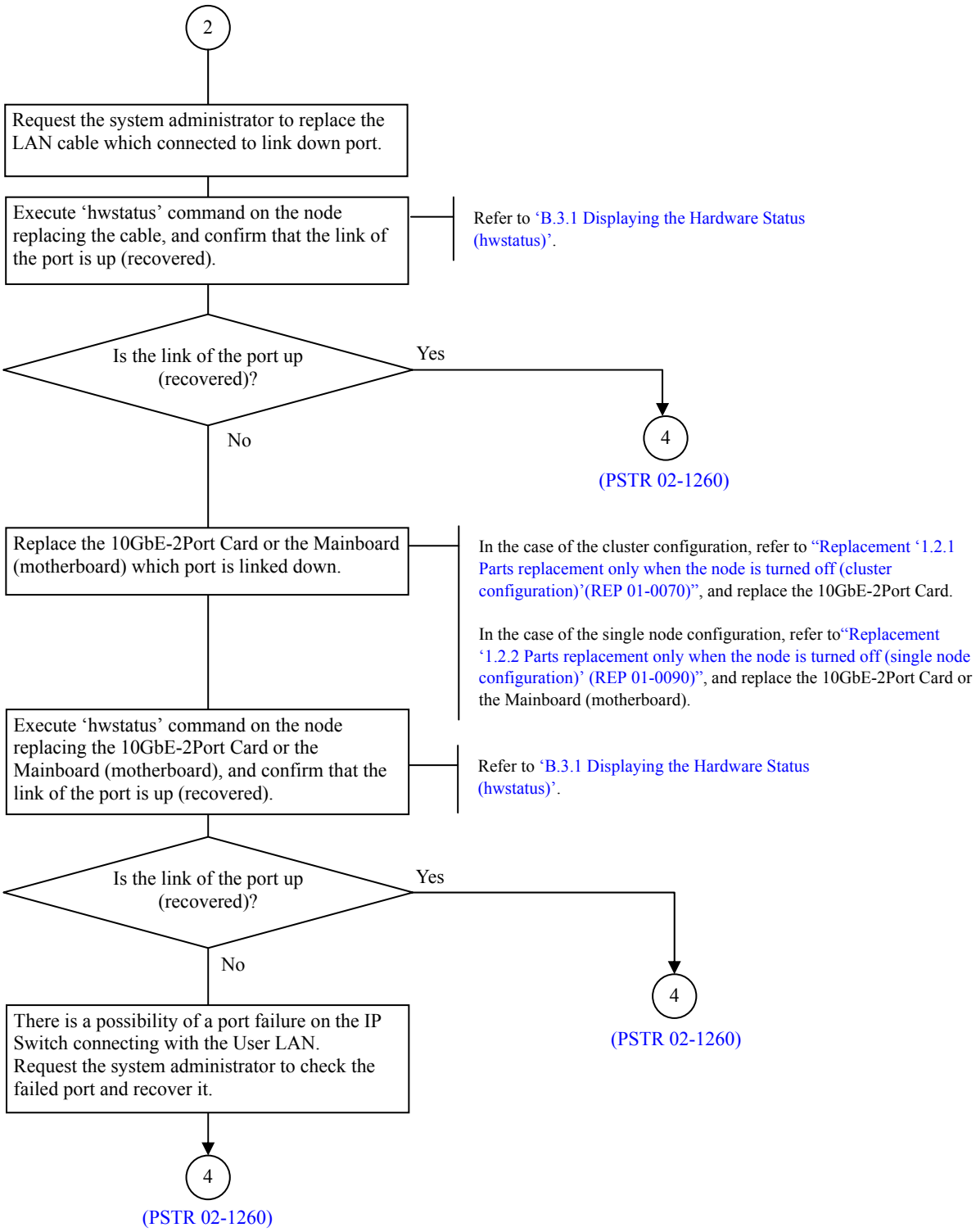

Figure C.2.3.6-3 Determination of network failure (KAQK36504-W) (3/4)

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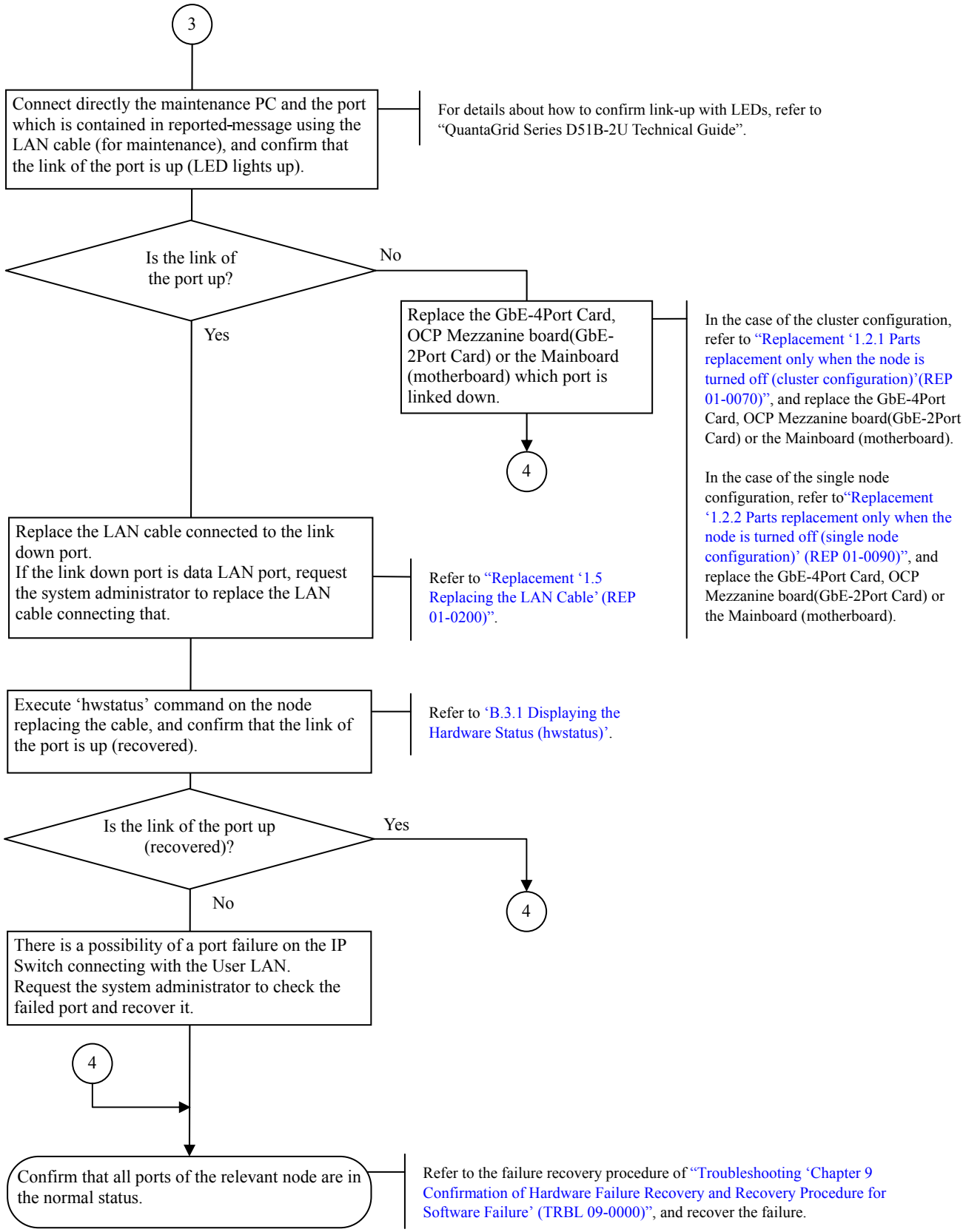

Figure C.2.3.6-3 Determination of network failure (KAQK36504-W) (4/4)

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(4) In the case of the KAQK39504-E

Describe troubleshooting procedure as follow in the case of the “KAQK39504-E Link down in Front-end LAN.” was displayed.

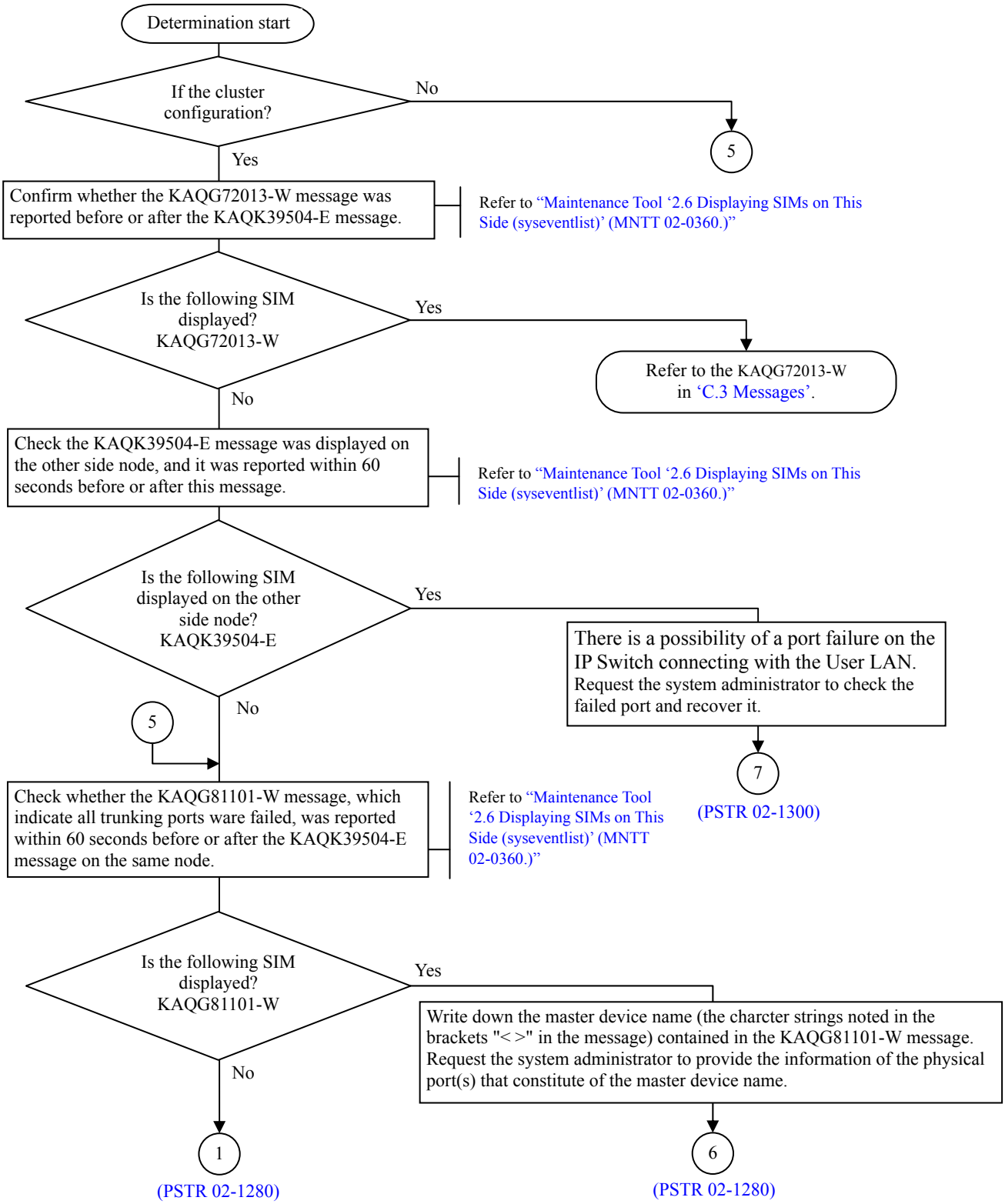

Figure C.2.3.6-4 Determination of network failure (KAQK39504-E) (1/4)

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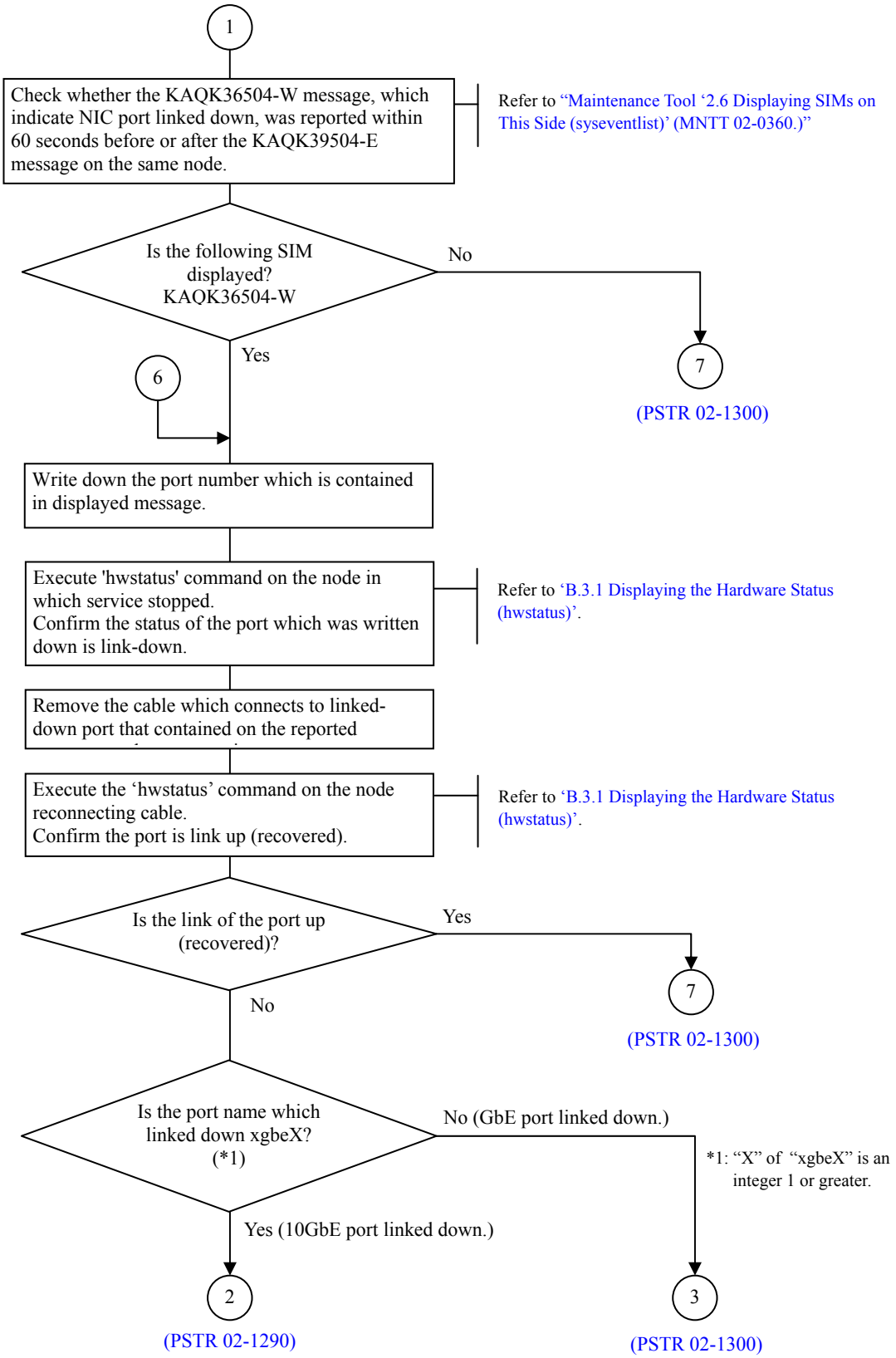

Figure C.2.3.6-4 Determination of network failure (KAQK39504-E) (2/4)

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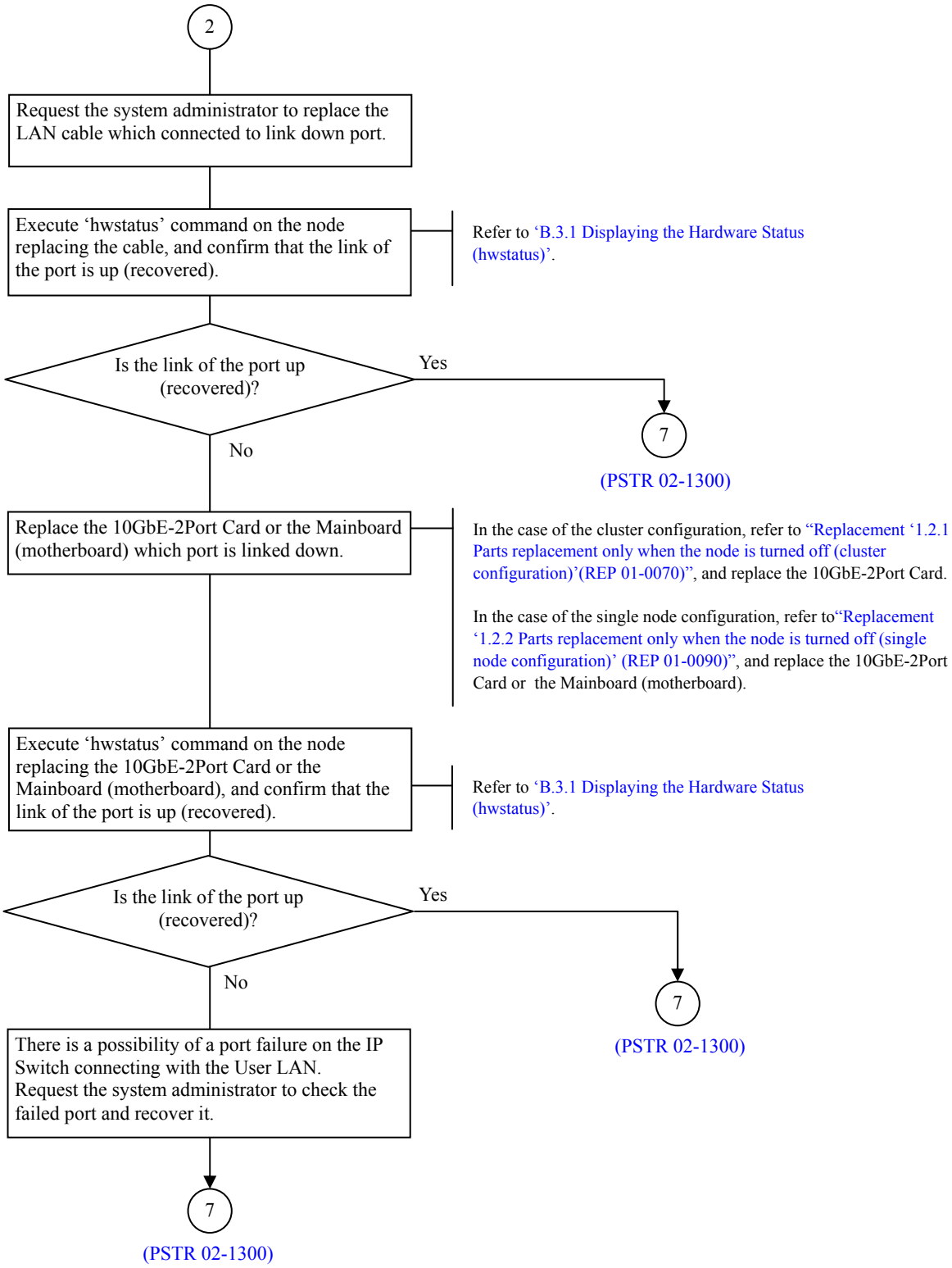

Figure C.2.3.6-4 Determination of network failure (KAQK39504-E) (3/4)

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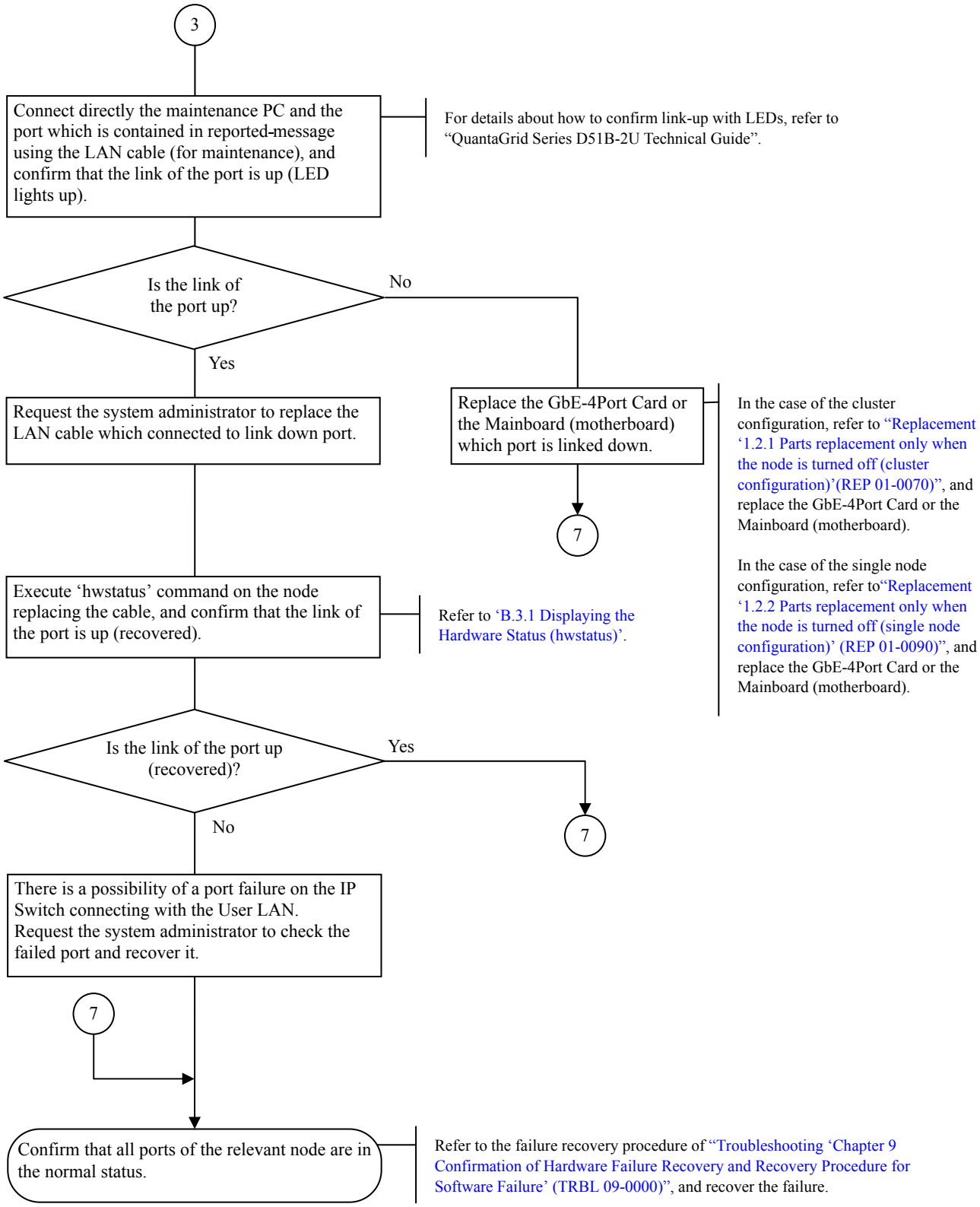

Figure C.2.3.6-4 Determination of network failure (KAQK39504-E) (4/4)

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C.2.4 Diagnosis for OS Boot Failure

This section describes how to diagnose when the replaced part failure or other failure cause the OS boot failure after parts replacement operation.

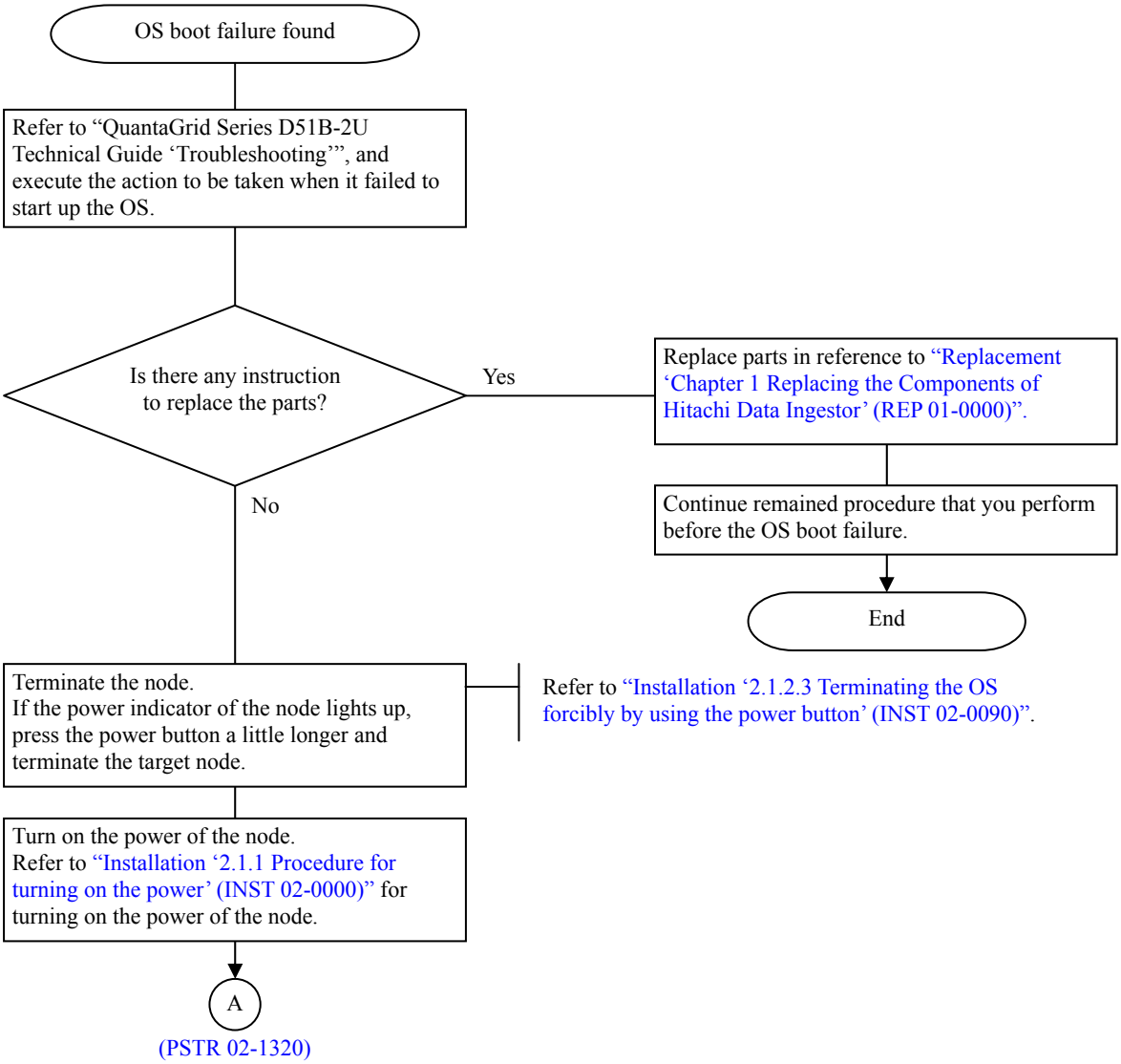

Figure C.2.4-1 Flow of Diagnosis for OS boot failure (1/5)

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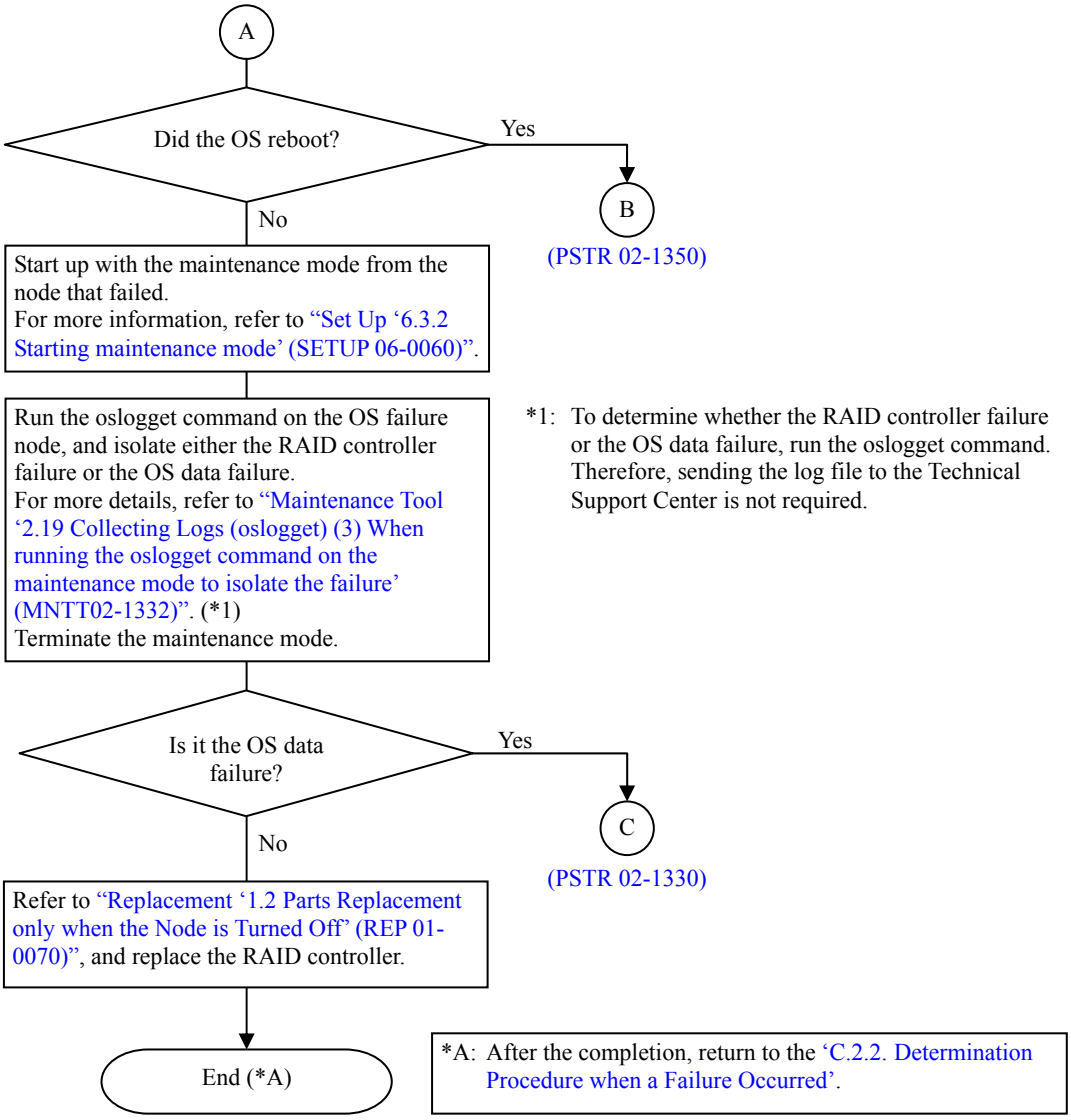

Figure C.2.4-1 Flow of Diagnosis for OS boot failure (2/5)

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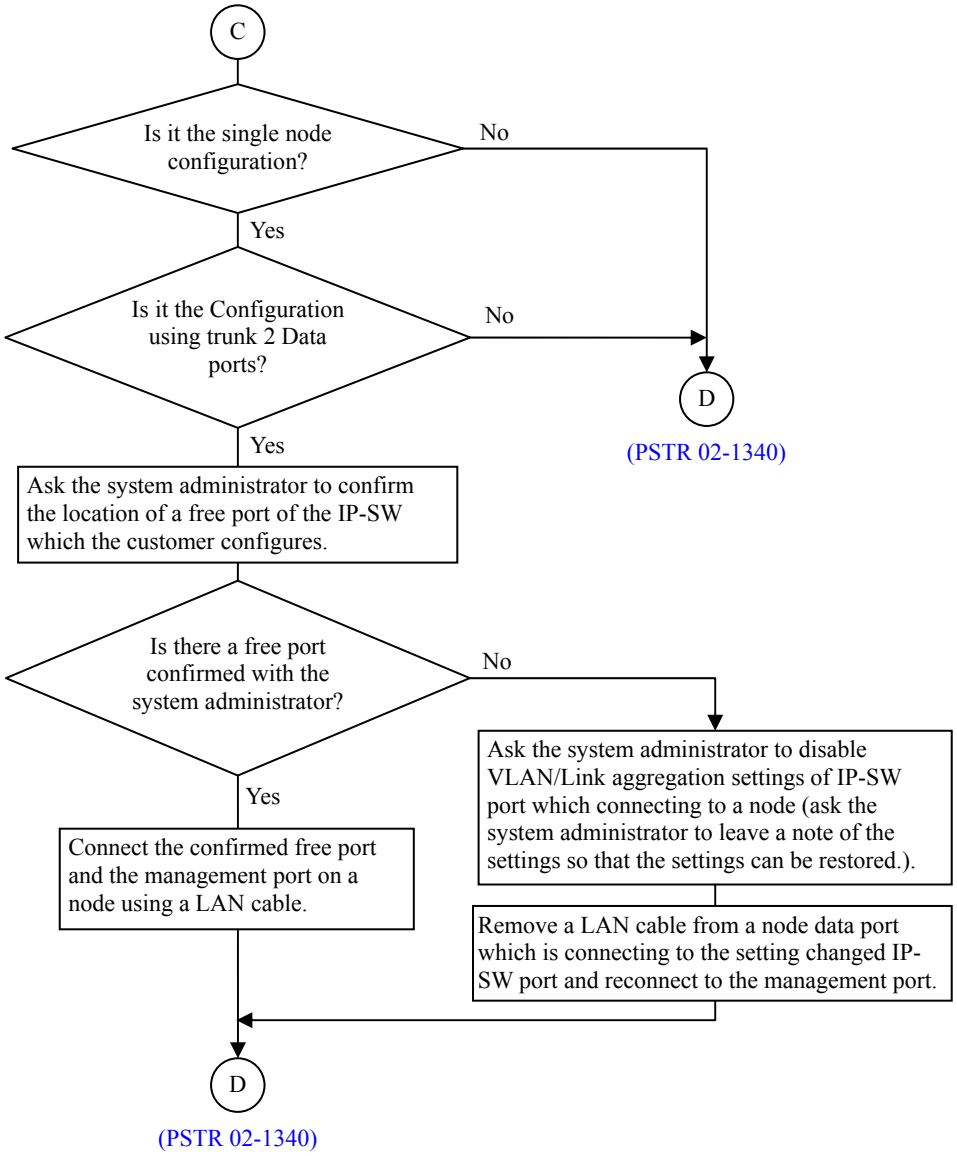

Figure C.2.4-1 Flow of Diagnosis for OS boot failure (3/5)

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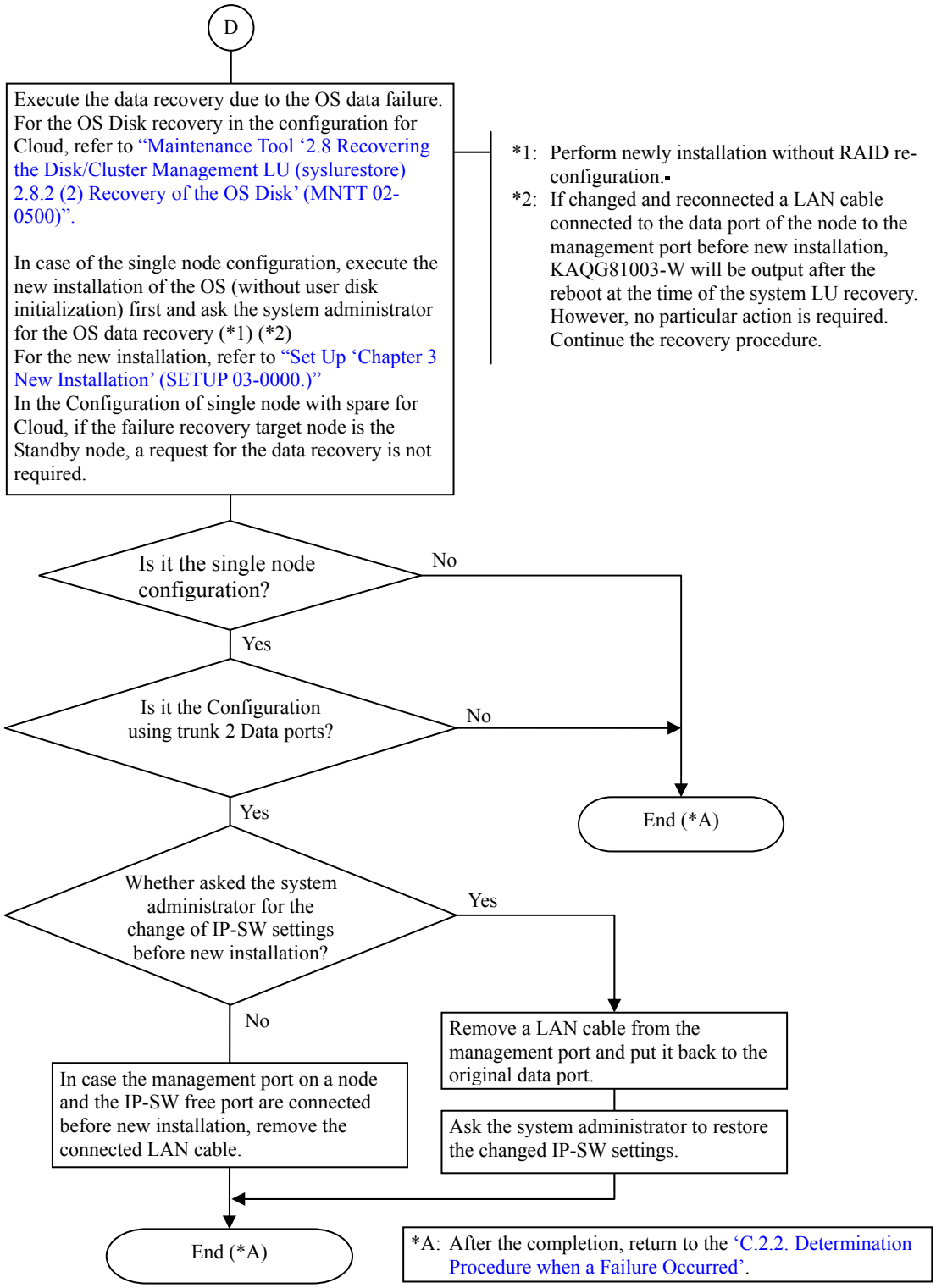

Figure C.2.4-1 Flow of Diagnosis for OS boot failure (4/5)

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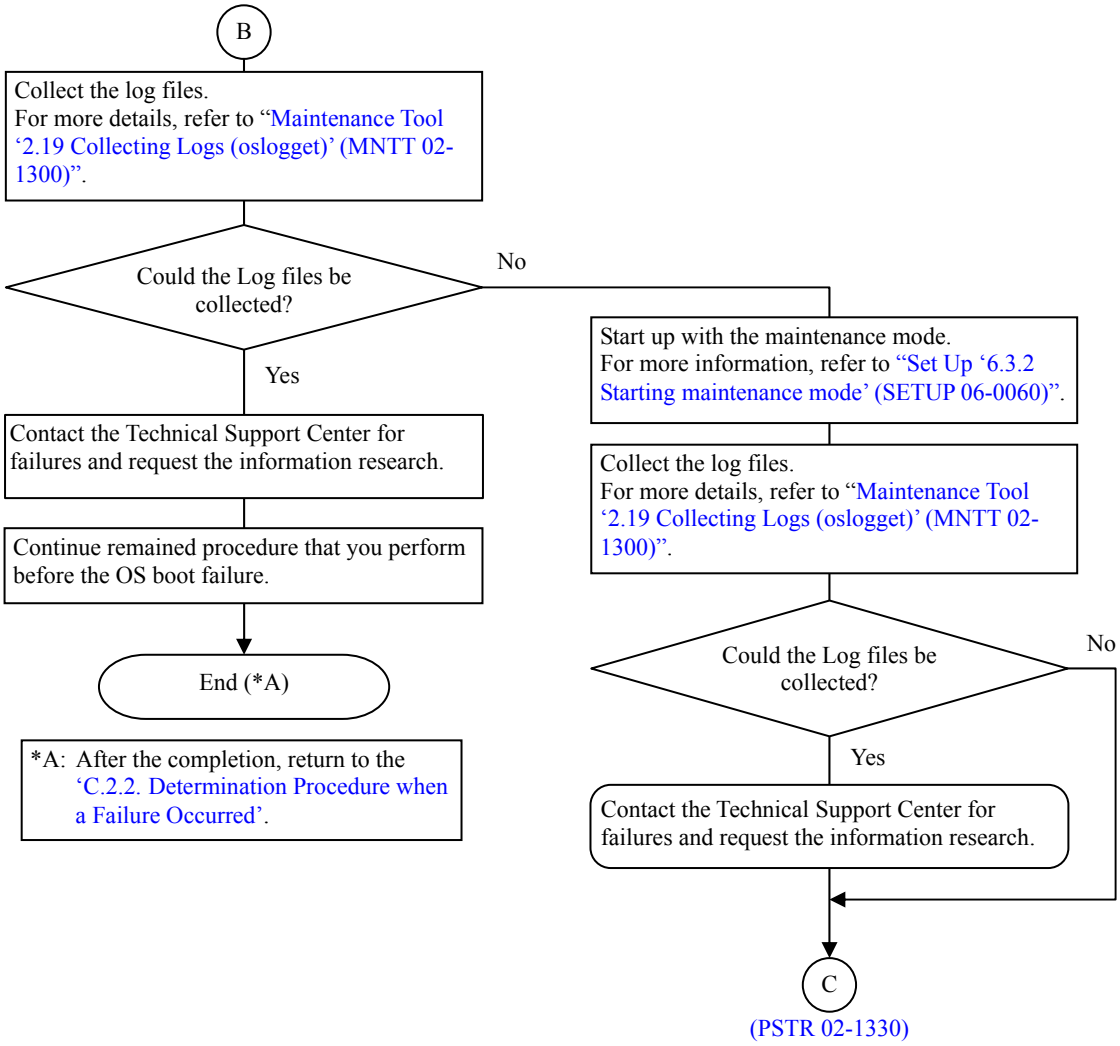

Figure C.2.4-1 Flow of Diagnosis for OS boot failure (5/5)

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C.3 Messages

This chapter describes messages.

C.3.1 SIM Messages

SIM messages detected by HDI and the recovery methods are described below.

Table C.3.1-1 Message IDs (70000s)

Message ID	Message text	Description	Recovery method	Reference Page
KAQG70000-E	Failover started, Node-<*node-number*> [(virtual server ID = <*virtual-server-ID*>)]	This message reports that a failover started at <*#node*>. When the target failover is Virtual Server, <*virtual-server-ID*> is output in brackets "( )".	—	—
KAQG70001-E	Failover ended, Node-<*node-number*> [(virtual server ID = <*virtual-server-ID*>)]	This message reports that a failover was completed at <*#node*>. When the target failover is Virtual Server, <*virtual-server-ID*> is output in brackets "( )".	—	—
KAQG72001-E	Failover ended(Move failed),Node-<*node-number*> [(virtual server ID = <*virtual-server-ID*>)]	This message reports that a failover failed. When the target failover is Virtual Server, <*virtual-server-ID*> is output in brackets "( )".	Perform the recovery procedure according to Troubleshooting "Chapter 1 Method of Local Initial Motion according to Maintenance Request".	"Troubleshooting 'Chapter 1 Method of Local Initial Measures According to Maintenance Request' (TRBL 01-0000)"
KAQG72011-E	Synchronization of the cluster information might become invalid.	This message reports that a failure occurred in the internal database of the cluster.	Perform the recovery procedure according to Troubleshooting "Chapter 1 Method of Local Initial Motion according to Maintenance Request".	"Troubleshooting 'Chapter 1 Method of Local Initial Measures According to Maintenance Request' (TRBL 01-0000)"

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Message ID	Message text	Description	Recovery method		Reference Page
KAQG72012-W	Communication via the main heartbeat cable was interrupted.	A failure occurred in the main heartbeat cable.	Follow the determination flowchart of Troubleshooting ‘C.2.3.6 Determination of network failure (1) In the case of the KAQG72012-W’.		‘C.2.3.6 Determination of network failure (1) In the case of the KAQG72012-W’
KAQG72013-W	Communication via the sub heartbeat cable was interrupted.	A failure occurred in the sub heartbeat cable.	①	Check if the KAQG72012-W message was reported before or after the KAQG72013-W message. • If it was reported, two heartbeat cables are disconnected (Link down). Proceed to step②. • If it was not reported, proceed to step③.	—
			②	Check if the failover completion message (KAQK70001-E) was reported within 60 seconds before or after this message. • If it is reported, refer to ‘C.2.3.4 Determining the node failure when failover occurred,’ and then execute the failure determination. • If it is not confirmed, refer to ‘C.2.3.2 Determination of management network failure’ and perform the recovery procedure.	‘C.2.3.4 Determining the node failure when failover occurred’ ‘C.2.3.2 Determination of management network failure’
			③	A failure occurred on the way of connecting maintenance LAN port of the node. Follow the procedure of ‘C.2.2 Determination Procedure when a Failure Occurred’.	‘C.2.2 Determination Procedure when a Failure Occurred’
KAQG72014-I	Communication via the main heartbeat cable was restored.	The main heartbeat cable has recovered.	—		—
KAQG72015-I	Communication via the sub heartbeat cable was restored.	The sub heartbeat cable has recovered.	—		—

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Message ID	Message text	Description	Recovery method	Reference Page
KAQG72026-E	The resource group on the other node will be forcibly failed over to clear the DISABLE state of the cluster.	Automatic forced failover occurred.	A failure occurs on the power source or on the heartbeat channel and the reset channel connecting the both nodes. Go to 'C.2.2 Determination Procedure when a Failure Occurred', and then execute the troubleshooting.	'C.2.2 Determination Procedure when a Failure Occurred'
KAQG72027-E	The OS will restart to clear the DISABLE state of the cluster.	Automatic forced failover occurred on the other side node.	① Check if the KAQG72026-E message was reported for the other side node at the same period of time. •If it is reported, a failure has been occurred on the routes of heartbeat and reset that are connecting both nodes. Refer to "Message IDs (KAQG72026-E)". •If it was not reported, or the other side node is stopped, proceed to step②.	Message IDs (KAQG72026-E)
			② It might be interrupted the process of forced failover due to another failure. Refer to Troubleshooting "Chapter 6 Acquiring Failure Information", and get the troubleshooting information. After that, contact to the technical support center.	"Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)"
KAQG72028-W	The forced failover state will be cleared because the problem on the other node has been resolved.	The state of automatic forced failover is recovered.	—	—
KAQG72029-E	To clear the forced failover state, an attempt was made to restart the OS of the other node, but the attempt failed.	Resetting of the other side node failed at the time of recovering the state of forced failover.	The heartbeat channel that connected both nodes of a cluster where was in the state of automatic forced failover is recovered, but the reset process for the other side node has failed because there was still a failure on the reset channel. Go to 'C.2.2 Determination Procedure when a Failure Occurred', and then execute the troubleshooting.	'C.2.2 Determination Procedure when a Failure Occurred'
KAQG72030-E	To clear the forced failover state, an attempt was made to release access protection on one more LUs, but the attempt failed.	Releasing of the LU access protection failed at the time of recovering the state of forced failover.	The heartbeat channel that connected both nodes of a cluster in the state of automatic forced failover is recovered, but the release of LU access protection has failed. Refer to Troubleshooting "5.3 Measures when Releasing the LU Access Protection Failed", and execute the recovery procedure.	"Troubleshooting '5.3 Measures when Releasing the LU Access Protection Failed' (TRBL 05-0530)"

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Table C.3.1-2 Message IDs (80000s)

Message ID	Message text	Description	Recovery method	Reference Page
KAQG81003-W	Trunking driver: One or more subdevices are down. *<master-device-name>:<subdevice-name>,<subdevice-name>…*	Links of the reported driver are combined (i.e. the number of links increases or decreases).	Follow the determination flowchart of Troubleshooting 'C.2.3.6 Determination of network failure (2) In the case of the KAQG81003-W'.	'C.2.3.6 Determination of network failure (2) In the case of the KAQG81003-W'
KAQG81004-I	Trunking driver: The subdevices that were down have been recovered. *<master-device-name>*: *<subdevice-name>*, *<subdevice-name>…*	Links of the reported driver are combined (i.e. down links have recovered).	—	—
KAQG81101-W	Trunking driver: The master device *<link-combined-device-name>* is down because all the sub-device were down.	Failures occurred in all ports of the combined links.	In the case of the cluster configuration, check if the KAQG70001-E message was reported within 60 seconds before or after this message. • If it is confirmed, follow the determination flowchart of Troubleshooting 'C.2.3.6 Determination of network failure (4) In the case of the KAQK39504-E'. • If it is not confirmed, there is a possibility of a port failure on the IP Switch connecting with the User LAN. Request the system administrator to check the failed port and recover it. After the IP Switch recovery, refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and confirm that all ports of the relevant node are in the normal status. In the case of the single node configuration, follow the determination flowchart of Troubleshooting 'C.2.3.6 Determination of network failure (4) In the case of the KAQK39504-E'.	'C.2.3.6 Determination of network failure (4) In the case of the KAQK39504-E' "Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"
KAQK81102-I	Trunking driver: The sub-devices that were down have recovered, and the master device *<link-combined-device>* has recovered.	All ports of the combined links have recovered.	—	—

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Table C.3.1-3 Message IDs (30000s)

Message ID	Message text	Description	Recovery method	Reference Page
KAQK30800-I	Migration terminated. (Policy name: *<policy name>*, Task id: *<task-id>*, Task status: *<task-status>*, Lastexec start time: *<lastexec-start-time>*, Lastexec end time: *<lastexec-end-time>*, Succeeded files: *<succeeded-files>*, Target files: *<target-files>*, Failed files: *<failed-files>*, Post-command result: *<post-command-result>*)	The termination of the migration job occurred.	—	—
KAQK31500-E	PS failure detected(*<PS-Unit No>*)	A failure occurred in the power supply indicated with the unit number.	Replace the power supply of the indicated unit number. Refer to "Replacement 1.1 Replacing the Power Supply Unit/ AC Cable" and perform the procedure.	"Replacement '1.1 Replacing the Power Supply Unit/ AC Cable'(REP 01-0030)"
KAQK31501-I	PS failure recovered(*<PS-Unit No>*)	The power supply of the indicated unit number has recovered.	—	—
KAQK31502-I	PS added. (*<PS-Unit No>*)	A power supply unit was added during operation.	Request the system administrator to restore the power supply configuration to the original status.	—
KAQK31503-I	PS removed(*<PS-Unit No>*)	A power supply unit was removed during operation.	Request the system administrator to restore the power supply configuration to the original status.	—
KAQK32500-E	FAN failure detected(*<FAN- Unit No>*)	A failure occurred in the fan indicated with the unit number.	Replace the fan unit.	"Replacement '1.2.1 Parts replacement only when the node is turned off (cluster configuration)'(REP 01-0070)" "Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)'(REP 01-0090)"
KAQK32501-I	FAN failure recovered(*<FAN- Unit No>*)	The fan of the indicated unit number has recovered.	—	—

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Message ID	Message text	Description	Recovery method	Reference Page
KAQK36504-W	NIC: Link down detected (<*interface-name*>)	NIC became link-down.	Follow the determination flowchart of Troubleshooting ‘C.2.3.6 Determination of network failure (3) In the case of the KAQK36504-W’.	‘C.2.3.6 Determination of network failure (3) In the case of the KAQK36504-W’
KAQK36700-E	An FC path error has occurred. (number of LUs for which errors occurred = <*number of LUs for which errors occurred*>)	FC path failure occurred. The number of LUs that the failures are detected is displayed.	Follow the determination flowchart of ‘C.2.2 Determination Procedure when a Failure Occurred’ and identify the failure location on the FC path.	‘C.2.2 Determination Procedure when a Failure Occurred’
KAQK36701-E	Errors have occurred on all the FC paths. (number, subsequent processing of LUs for which errors occurred = <*number, subsequent processing of LUs for which errors occurred*>)	Failures occurred in all paths to the LU. The number of LUs from which failures are detected is displayed. In the case “reboot” is displayed as the subsequent processing, the OS has been restarted once after the failure. In the case “continue” or “failure” is displayed as the subsequent processing, the OS has been running (not restarted). In the case of “disconnect”, the OS has been restarted once after the failure usually, but depend on the settings, the OS may have been running without restarting.	Check if the KAQK39527-E message was reported after this message . • If it is confirmed, refer to “Message IDs (KAQK39527-E)”. • If it is not confirmed, Confirm that the KAQK36700-E message was reported before this message. Perform the same procedure as for “Message IDs (KAQK36700-E)”.	‘Message IDs (KAQK39527-E)’ Message IDs (KAQK36700-E)

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Message ID	Message text	Description	Recovery method	Reference Page
KAQK36703-E	An attempt to allocate memory failed.	Failed to allocate memory.	Check if the KAQK36705-E message was reported after this message. • If it is confirmed, refer to "Message IDs (KAQK36705-E)". • If it is not confirmed, follow the determination flowchart of 'C.2.2 Determination Procedure when a Failure Occurred' to identify the failure location on the FC path.	Message IDs (KAQK36705-E) 'C.2.2 Determination Procedure when a Failure Occurred'
KAQK36704-E	An attempt to attach the HDLM driver (the filter component) has failed. Number of failed paths = *<number>*	Unsupported disk array is detected.	Request the system administrator to check the zoning setting of FC-SW.	—
KAQK36705-E	The system retried to allocate memory but the retries failed.	Memory allocation was attempted in succession but failed.	FC path failure. Follow the determination flowchart of 'C.2.2 Determination Procedure when a Failure Occurred' to identify the failure location on the FC path.	'C.2.2 Determination Procedure when a Failure Occurred'
KAQK37503-E	CPU temperature warning detected[*<CPU No>*]	Abnormal temperature is detected.	① Check the room temperature. (Room temperature: 10 to 40 degrees C is acceptable) Execute the hwstatus command from the maintenance PC to check if the fan operates normally. • If the fan status is abnormal, replace the fan. After replacement, confirm that all fans operate normally. • If the fan status is normal, proceed to step②	'B.3.1 Displaying the Hardware Status (hwstatus)' "Replacement '1.2.1 Parts replacement only when the node is turned off (cluster configuration)'(REP 01-0070)" "Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)'(REP 01-0090)"
			② Acquire the failure information by referring to Troubleshooting "Chapter 6 Acquiring Failure Information".	"Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)"
KAQK37506-E	Internal disk drive failure detected(internal_disk_*<number>*)	The internal drive failed. (The relevant drive number)	Refer to "Replacement 1.3 Replacing the Internal Hard Disk Drive" and replace the internal drive.	"Replacement '1.3 Replacing the Internal Hard Disk Drive'(REP 01-0110)"
KAQK37507-I	Internal disk drive failure recovered(internal_disk_*<number>*)	The internal drive recovered from failure. (The relevant drive number)	—	—
KAQK37508-W	BMC network communication failure detected	Communication is lost between the management port (in the BMC direct connection configuration, Reset port) and the remote node's BMC port.	Refer to Troubleshooting 'C.2.2 Determination Procedure when a Failure Occurred' to check if this is a management LAN failure.	'C.2.2 Determination Procedure when a Failure Occurred'
KAQK37509-I	BMC network communication failure recovered	Communication is reestablished between the management port (in the BMC direct connection configuration, Reset port) and the remote node's BMC port.	—	—

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Message ID	Message text	Description	Recovery method	Reference Page
KAQK37510-W	Management network communication failure detected	Communication is lost between the local management port and the remote node's management port.	Refer to Troubleshooting 'C.2.2 Determination Procedure when a Failure Occurred' to check if this is a management LAN failure.	'C.2.2 Determination Procedure when a Failure Occurred'
KAQK37511-I	Management network communication failure recovered	Communication is reestablished between the local management port and the remote node's management port.	—	—
KAQK37512-E	The number of internal RAID device media errors has exceeded the threshold. (internal_disk_<*number*>)	A media error in the built-in drive is detected.	Execute hwstatus command and check [Internal HDD Information] to identify the failed drive. Replace the built-in drive that is subject to be replaced for the prevention.	'B.3.1 Displaying the Hardware Status (hwstatus)' "Replacement '1.3 Replacing the Internal Hard Disk Drive'(REP 01-0110)"
KAQK37513-I	The number of internal RAID device media errors has been cleared. (internal_disk<*number*>)	A media error in the built-in drive is recovered.	—	—
KAQK37514-E	The number of internal RAID device S.M.A.R.T. warnings has exceeded the threshold. (internal_disk_<*number*>)	The built-in drive detects S.M.A.R.T. warning.	Replace the built-in drive that is subject to be replaced for the prevention.	"Replacement '1.3 Replacing the Internal Hard Disk Drive'(REP 01-0110)"
KAQK37515-I	The number of internal RAID device S.M.A.R.T. warnings has been cleared. (internal_disk_<*number*>)	Recovered the S.M.A.R.T. warning that is detected by the built-in drive.	—	—

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Message ID	Message text	Description	Recovery method	Reference Page
KAQK37516-I	Patrol Read detected information.(Details: time =<*time*>, code = <*code*>, content = <*content*>, count = <*count*>)	Some events about internal drive were detected. (Number of count is displayed only when the multiple events occurred.)	—	—
KAQK37518-I	Patrol Read detected an error.(Details: time =<*time*>, code = <*code*>, content = <*content*>, count = <*count*>)	Critical Error might be occur at internal drive. (Number of count is displayed only when the multiple errors occurred.)	The slot number of failed internal drive is displayed as "sX (X is positive integer)" in "content" of the message. Replace the internal drive connected to that slot number.	"Replacement '1.3 Replacing the Internal Hard Disk Drive'(REP 01-0110)"
KAQK37521-I	Communication temporarily went down between the management port and the BMC port on the other node.	The communication between the management port (in the BMC direct connection configuration, Reset port) and the BMC port on the other side node lost temporarily.	Check if KAQK37508-W or KAQK37522-I exists after this SIM. If the message exists, follow the instruction described in that message. If the message does not exist, no measurement is required because the communication was lost temporarily but it recovers at present.	'Message IDs (KAQK37508-W)' Message IDs (KAQK37522-I))
KAQK37522-I	Intermittent failures have been detected <*X*> times between the management port and the BMC port on the other node.	The intermittent failure between the management port (in the BMC direct connection configuration, Reset port) and the BMC port in the other side node is detected x times.	Check if KAQK37508-W exists after this SIM. If the message exists, follow the instruction described in that message. If the message does not exist, no measurement is required because the communication was lost temporarily but it recovers at present. However, If this message shows frequency, the cable might not be connected completely. Therefore, check the connection between the cable on the maintenance port and the cable of the BMC port on the other side node.	'Message IDs (KAQK37508-W)'
KAQK37523-I	Information regarding the internal RAID battery was detected. (time = <*time*>, code =0x000c, content = <*content*>)	An event about internal RAID battery was detected.	—	—
KAQK37524-W	An internal RAID battery failure was detected. (time = <*time*>, code = 0x000a, content = <*content*>)	A failure event about internal RAID battery was detected.	There is a possibility that a part of data has been lost. Execute the OS initial installation (with RAID reconfiguration), and request the system administrator to execute the recovery operation. Refer to 'C.1.2 When Detected by SNMP Trap' for more details.	'C.1.2 When Detected by SNMP Trap'
KAQK37525-E	An internal RAID battery failure was detected. (time = <*time*> code = <*code*>, content = <*content*>)	A cache backup module failure was detected.	Cache data recovery (writing the data to Flash memory, or reading the data at the time of power restoration) was failed. Replace the Internal RAID battery.	"Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)'(REP 01-0090)"
KAQK37526-I	Consistency Check detected information. (time = <*time*>, code = <*code*>, content = <*content*>, count = <*count*>)	Consistency check detected information ("count" is displayed only when information is detected more than once.)	—	—

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Message ID	Message text	Description	Recovery method	Reference Page
KAQK37528-E	Consistency Check detected an error.(time = <*time*>, code = <*code*>, content = <*content*>, count = <*count*>)	Consistency check detected an error ("count" is displayed only when errors are detected more than once.)	Check that the status of "Internal HDD Information" is "OK" by executing hwstatus command. After checking, collect the failure information and contact the developer."	'B.3.1 Displaying the Hardware Status (hwstatus)' "Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)"
KAQK37530-I	The system recovered from an internal RAID battery failure.	The system recovered from a cache backup module failure,	—	—
KAQK37532-E	A failure has been detected in an internal RAID battery.	A failure has been detected in a cache backup module.	Replace the Internal RAID battery.	"Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)'(REP 01-0090)"
KAQK39500-E	OS error Detail= 00 00 00 01 ,Level =00 , Type=02	The file system necessary for booting is blocked or failed in mounting.	Follow the determination flowchart of 'C.2.2 Determination Procedure when a Failure Occurred'.	'C.2.2 Determination Procedure when a Failure Occurred'
	OS error Detail= 00 00 00 02 ,Level =00 , Type=02	A user file system is blocked.	Follow the determination flowchart of 'C.2.2 Determination Procedure when a Failure Occurred'.	'C.2.2 Determination Procedure when a Failure Occurred'
	OS error Detail= 00 00 00 03 ,Level =00 , Type=02	(Cluster configuration) A cluster management LU file system is blocked. (Single node configuration) The file system of the OS area is blocked.	In the cluster configuration, follow the determination flowchart of Troubleshooting "9.1.3 Recovery Procedure for Software Failure". In the single node configuration, follow the determination flowchart of Troubleshooting "9.2.3 Recovery Procedure for Software Failure".	"Troubleshooting '9.1.3 Recovery Procedure for Software Failure' (TRBL 09-0040)" "Troubleshooting '9.2.3 Recovery Procedure for Software Failure' (TRBL 09-0690)"
	OS error Detail= 00 00 00 06 ,Level =00 , Type=02	A Virtual Server system LU is blocked.	Follow the determination flowchart of Troubleshooting "9.1.3 Recovery Procedure for Software Failure".	"Troubleshooting '9.1.3 Recovery Procedure for Software Failure' (TRBL 09-0040)"
	OS error Detail= 00 00 03 00 ,Level =00 , Type=0D	Breakdown of the heartbeat between the primary and the secondary is detected.	① Perform "clstatus" on the node that have this SIM message, and check the cluster status.	"Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)"
			② 'C.2.2 Determination Procedure when a Failure Occurred'	'C.2.2 Determination Procedure when a Failure Occurred'

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Message ID	Message text	Description	Recovery method	Reference Page
(Continued) KAQK39500-E	OS error Detail= 00 00 03 01 ,Level =00 , Type=0D	Breakdown of the heartbeats between the primary and the secondary is detected, and resetting route on the management LAN is detected.	To confirm the failure on the management LAN, execute the determination procedure from the 'C.2.2 Determination Procedure when a Failure Occurred'.	'C.2.2 Determination Procedure when a Failure Occurred'
	OS error Detail= 00 00 04 00 ,Level =00 , Type=0D	The reset ping-pong prevention was operated.	Follow the determination flowchart of 'C.2.2 Determination Procedure when a Failure Occurred'.	'C.2.2 Determination Procedure when a Failure Occurred'
	OS error Detail= 00 01 00 02 ,Level =00 , Type=0A	The target file system to be stored is initialized before creating dump file.	Node is rebooted because of occurrence of an error, and an error is detected while collecting Dump. Collect the information of troubles, and report it to the Technical Support Center after executing troubleshooting with referring to the chapter of troubleshooting.	"Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)"
	OS error Detail= 00 02 00 02 ,Level =00 , Type=0A	Failed to mount the target file system to be stored at the time of dump collecting.	An error detected in the dump area while starting the node. Execute troubleshooting with referring to 'C.2.2 Determination Procedure when a Failure Occurred'.	'C.2.2 Determination Procedure when a Failure Occurred'
	OS error Detail= 05 00 00 00 ,Level =00 , Type=03	A panic failure occurred on the node that failed.	① • If it is after nncreset command execution of the "Maintenance Tool '2.30 Resetting the OS of the Node (nncreset)'" performed by the maintenance personnel, proceed to step②. • If it is not a result of the command that is executed by the maintenance personnel, proceed to step③.	"Maintenance Tool '2.30 Resetting the OS of the Node (nncreset)' (MNTT 02-1840)"
			② It indicates that the nncreset command successfully complete and the dump can be obtained normally. Proceed to the next step such as the collecting dump.	—
			③ A panic failure occurred on the node that failed, and the dump can be obtained normally after the failure. Refer to 'C.2.3.4 Determining the node failure when failover occurred,' and then execute the failure determination.	'C.2.3.4 Determining the node failure when failover occurred'

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Message ID	Message text	Description	Recovery method		Reference Page
(Continued) KAQK39500-E	OS error Detail= 05 00 00 01 ,Level =00 , Type=03	Memory image copying is complete successfully.	①	• If it is manual dump collection by the system administrator or the maintenance personnel (dump collection by the NMI button or the nncreset command of "Maintenance Tool '2.30 Resetting the OS of the Node (nncreset)'", proceed to step②. • In other cases than the above, proceed to step③.	"Maintenance Tool '2.30 Resetting the OS of the Node (nncreset)' (MNTT 02-1840)"
			②	After a while, if "KAQK39528-I Processing to convert dump files ended." is displayed, as the dump file conversion is successful, execute the subsequent operation such as downloading dump. If the other SIM than the above is displayed after a while, the dump file creation failed. Collect the failure information, and contact the developer.	"Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)"
			③	A panic failure occurred on the failed node, and then the dump is acquired normally. Refer to 'C.2.3.4 Determining the node failure when failover occurred', and determine the failure.	'C.2.3.4 Determining the node failure when failover occurred'
	OS error Detail= 06 00 00 00 ,Level =00 , Type=03	Dump conversion timeout.	The node is rebooted due to a software failure. Collect the failure information and contact the developer.		"Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)"
	OS error Detail= 06 00 01 00 ,Level =00 , Type=03	Dump file conversion failed.	The node is rebooted due to a software failure. Collect the failure information and contact the developer.		"Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)"
	OS error Detail= 06 00 02 00 ,Level =00 , Type=03	Forced conversion of the dump file failed.	The node is rebooted due to a software failure. Collect the failure information and contact the developer.		"Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)"
	OS error Detail= 06 00 03 00 ,Level =00 , Type=03	Memory image copying failed.	The node is rebooted due to a software failure. Collect the failure information and contact the developer.		"Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)"
	OS error Detail= 06 01 01 00 ,Level =00 , Type=0A	Failed to register the function of dump file creation.	Failed to register the dump file creation function which is executed at the time of boot the node. Collect the failure information and contact the developer.		"Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)"
KAQK39501-E	Fatal failure detected. Shutting down.	An emergency shutdown occurred.	—		—
KAQK39502-I	OS is ready	This message is reported just before completion of the OS boot.	—		—
KAQK39503-I	OS is shutting down.	This message reports that shutdown of either system or both systems have started.	—		—
KAQK39504-E	Link down in Front-end LAN	The data LAN or the maintenance LAN is link-down.	Follow the determination flowchart of Troubleshooting 'C.2.3.6 Determination of network failure (4) In the case of the KAQK39504-E'.		'C.2.3.6 Determination of network failure (4) In the case of the KAQK39504-E'

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Message ID	Message text	Description	Recovery method	Reference Page
KAQK39505-E	OS error[cluster] Detail=00 01 00 00	Mounting the cluster management LU failed (CLU_partition failure).	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	OS error[cluster] Detail=00 02 00 00	Pre-processing of NFS failed.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	OS error[cluster] Detail=00 03 00 00	Mounting the file system failed.	Ask the system administrator for the enabling or disabling of the local data encryption and the HCP payload encryption. If the local data encryption is enabled, ask the system administrator to confirm one of the system messages KAQM05256-E, KAQM05258-E to KAQM05264-E, KAQM05323-E, KAQM05325-W has not been output. In case the one of the messages has been output, ask the system administrator to take an appropriate action. If no message has been output, or the local data encryption and HCP payload encryption are disabled, refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	OS error[cluster] Detail= 00 04 00 00	Starting the NFS sharing failed.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”

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Message ID	Message text	Description	Recovery method		Reference Page
(Continued) KAQK39505-E	OS error[cluster] Detail=00 05 00 00	Bringing the virtual IP up failed.	①	Check if the KAQK39504-E message was reported within 60 seconds before or after this message. • If it is confirmed, proceed to step②. • If it is not confirmed, proceed to step③.	'Message IDs (KAQK39504-E)'
			②	Perform the maintenance procedure described in "Message IDs (KAQK39504-E)".	'Message IDs (KAQK39504-E)'
			③	Refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.	"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"
	OS error[cluster] Detail=00 06 00 00	Starting the CIFS service failed.	Refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.		"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"
	OS error[cluster] Detail=00 08 00 00	Startup processing of the resource group failed.	Refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.		"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"
	OS error[cluster] Detail=00 0A 00 00	File snapshot or file version restore function failure (Startup processing of the resource group failed.)	Refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.		"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"
	OS error[cluster] Detail= 00 0B 00 00	Start processing of Virtual Server failed.	Ask the system administrator for the enabling or disabling of the local data encryption and the HCP payload encryption. If the local data encryption is enabled, ask the system administrator to confirm one of the system messages KAQM05256-E, KAQM05258-E to KAQM05264-E, KAQM05323-E, KAQM05325-W has not been output. In case the one of the messages has been output, ask the system administrator to take an appropriate action. If no message has been output, or the local data encryption and HCP payload encryption are disabled, refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.		"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"

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Message ID	Message text	Description	Recovery method	Reference Page
(Continued) KAQK39505-E	OS error[cluster] Detail=01 01 00 00	Un mounting the cluster management LU failed (CLU_partition failure).	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	OS error[cluster] Detail=01 02 00 00	Post-processing of NFS failed.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	OS error[cluster] Detail=01 03 00 00	Unmounting the file system failed.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	OS error[cluster] Detail=01 04 00 00	Stopping the NFS sharing failed.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	OS error[cluster] Detail=01 05 00 00	Bringing the virtual IP down failed.	① Check if the KAQK39504-E message was reported within 60 seconds before or after this message. • If it is confirmed, proceed to step②. • If it is not confirmed, proceed to step③.	‘Message IDs (KAQK39504-E)’
			② Perform the maintenance procedure described in “Message IDs (KAQK39504-E)”.	‘Message IDs (KAQK39504-E)’
			③ Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”

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Message ID	Message text	Description	Recovery method	Reference Page
(Continued) KAQK39505-E	OS error[cluster] Detail=01 06 00 00	Stopping the CIFS service failed.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	OS error[cluster] Detail=01 08 00 00	Stop processing of the resource group failed.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	OS error[cluster] Detail=01 0A 00 00	File snapshot or file version restore function failure (Stop processing of the resource group failed.)	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	OS error[cluster] Detail= 01 0B 00 00	Stopping Virtual Server failed.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”

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Message ID	Message text	Description	Recovery method	Reference Page
KAQK39506-I	A failure occurred. Please follow the proper recovery procedure. Detail=10 03 00 00	All file systems were blocked due to D-vol overflow (when the script was started).	Send the content of this message to the system administrator.	—
	A failure occurred. Please follow the proper recovery procedure. Detail=10 04 00 00	All NFSs were blocked due to D-vol overflow (when the script was started).	Send the content of this message to the system administrator.	—
KAQK39507-E	Reset to the other node in the cluster was requested (result:<*reset requested result*>, cause:<*reset cause*>, os status:<*OS status*>).	Resetting for the other side is issued.	If the content of the result is "failure", resetting the other side node is not successful. Determine the failure with 'C.2.2 Determination Procedure when a Failure Occurred'. If the content of the result is other than above, it is normal processing and not required any troubleshooting.	'C.2.2 Determination Procedure when a Failure Occurred'
KAQK39524-E	Peer os status could not be acquired.	Acquisition of status of the other side node failed.	① Check if the KAQK37508-W message was reported before or after reporting the KAQK39508-E message. • If it is reported, refer to "Message IDs (KAQK37508-W)". • If it is not reported, proceed to step②.	'Message IDs (KAQK37508-W)'
			② A failure is in the setting of BMC. Refer to "Maintenance tool 2.18 Setting BMC LAN Information (bmcctl) (3) Setting BMC account", and then set the BMC account.	"Maintenance Tool '2.18 Setting BMC LAN Information (bmcctl)' (MNTT 02-1210)"
KAQK39525-I	Peer os status could be acquired.	Recovered to the state to get the other side node status.	—	—
KAQK39526-I	The blockage of the file system (file-system-name) has been released.	The blockage of the file system (file-system name) has been released.	—	—
KAQK39527-E	A file system (file system name = <*file system name*>, device = <*device number*>) is blocked because there is no unused capacity in the Pool	The user file system has been in blockage because of the DP pool exhaustion .	Ask system administrator to recover the DP pool exhaustion.	—
KAQK39528-I	Processing to convert dump files ended.	Dump file conversion ended normally.	—	—
KAQK39529-E	Dump file conversion processing for the virtual server ended successfully. (virtual server ID = <*virtual server ID*>)	Dump file conversion of the displayed Virtual Server ID ended normally	After a while, if the message of "KAQK39539-I Conversion processing ended successfully for all the dump files." is displayed on the window, the dump file conversion for all the Virtual Servers is successfully complete. Therefore, proceed to the next step such as the dump collection.	—

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Message ID	Message text	Description	Recovery method	Reference Page
KAQK39530-E	Acquisition of the dump file header information for the virtual server failed. (virtual server ID = <*virtual server ID*>)	Failed to get the dump file header information of the displayed Virtual Server ID.	Request the system administrator to reboot the relevant Virtual Server of the ID that is displayed on the window. When the system administrator is not available to operate it, maintenance personnel should execute this process by using vnasrestart command. If the same SIM message is displayed after the reboot, collect the failure information and contact the Technical Support Center.	"Maintenance Tool '2.77 Restart of Virtual Server (vnasrestart)' (MNTT 02-4090) "Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)"
KAQK39531-E	Dump file creation processing failed because the number of virtual server dump files reached the limit. (virtual server ID = <*virtual server ID*>)	The dump file of the displayed Virtual Server ID could not be created because the number of dump files has reached 5 files that was the upper limit of file storage.	Collect the failure information, and contact the Technical Support Center. The dump file of the displayed Virtual Server ID is not created even after some existing dump files are deleted. If the dump file of the displayed Virtual Server ID is necessary, refer to Troubleshooting "6.2.1.2 Collecting dump files manually", and then collect the dump file.	"Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)" "Troubleshooting '6.2.1.2 Collecting dump files manually' (TRBL 06-0030)"
KAQK39532-E	Dump file creation processing failed. (virtual server ID = <*virtual server ID*>)	Failed to create the dump file of the displayed Virtual Server ID because the capacity of the dump file storage area was insufficient.	Collect the failure information, and contact the Technical Support Center. The dump file of the displayed Virtual Server ID is not created even after some existing dump files are deleted. If the dump file of the displayed Virtual Server ID is necessary, refer to Troubleshooting "6.2.1.2 Collecting dump files manually", and then collect the dump file.	"Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)" "Troubleshooting '6.2.1.2 Collecting dump files manually' (TRBL 06-0030)"
KAQK39533-E	Dump file conversion processing for the virtual server was stopped.	Dump file conversion processing was inhibited because the capacity of dump file storage area was insufficient.	Download all the stored dump files and delete them all. After that, the converting process of the unconverted dump files is executed automatically.	"Maintenance Tool '2.21 Procedure for Collecting Dump Files' (MNTT 02-1400)
KAQK39534-E	Dump file forced conversion processing for the virtual server ended successfully. (virtual server ID = <*virtual server ID*>)	Although the dump file conversion processing of the displayed Virtual Server ID is complete, a problem might have occurred on a part of converting process.	Collect the failure information, and then contact the technical support center.	"Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)"
KAQK39535-E	Dump file conversion processing for the virtual server failed.(virtual server ID = <*virtual server ID*>)	Failed the convert the dump file of displayed Virtual Server ID.	Collect the failure information, and then contact the technical support center.	"Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)"
KAQK39536-E	An error occurred in dump file creation processing for the virtual server.	Failed to create the dump file of displayed Virtual Server ID.	Collect the failure information, and then contact the technical support center.	"Troubleshooting 'Chapter 6 Acquiring Failure Information' (TRBL 06-0000)"

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Message ID	Message text	Description	Recovery method	Reference Page
KAQK39538-E	An OS error was detected on the virtual server.(virtual server ID = <virtual server ID>)	The virtual Server of the displayed Virtual Server ID is blocked.	Execute the troubleshooting from the 'C.2.2 Determination Procedure when a Failure Occurred'.	'C.2.2 Determination Procedure when a Failure Occurred'
KAQK39539-I	Conversion processing ended successfully for all the dump files.	Converting all the unconverted dump files is complete.	—	—
KAQK39540-I	The virtual server was reset. (virtual server ID=<virtual server ID>)	The displayed Virtual Server ID was reset.	—	—
KAQK39601-E	Single Node error Detail=00 00 00 10 Level=00 Type=04	Mounting of file system failed.	Ask the system administrator for the enabling or disabling of the local data encryption and the HCP payload encryption. If the local data encryption is enabled, ask the system administrator to confirm one of the system messages KAQM05256-E, KAQM05258-E to KAQM05264-E, KAQM05323-E, KAQM05325-W has not been output. In case the one of the messages has been output, ask the system administrator to take an appropriate action. If no message has been output, or the local data encryption and HCP payload encryption are disabled, refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.	"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"
	Single Node error Detail=00 00 00 11 Level=00 Type=04	Dismounting of file system failed.	Refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.	"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"
	Single Node error Detail=00 00 00 20 Level=00 Type=04	Starting the NFS sharing failed.	Refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.	"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"
	Single Node error Detail=00 00 00 21 Level=00 Type=04	Terminating the NFS sharing failed.	Refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.	"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"
	Single Node error Detail=00 00 00 40 Level=00 Type=04	Startup of the CIFS service failed.	Refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.	"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"

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Message ID	Message text	Description	Recovery method	Reference Page
(Continued) KAQK39601-E	Single Node error Detail=00 00 00 41 Level=00 Type=04	Stopping of the CIFS service failed.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	Single Node error Detail=00 00 00 50 Level=00 Type=04	Startup of the File snapshot or the file version restore function failed.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	Single Node error Detail=00 00 00 51 Level=00 Type=04	Stopping of the File snapshot or the file version restore function failed.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	Single Node error Detail=00 00 00 F0 Level=00 Type=04	Startup of the resource on the single node failed.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	Single Node error Detail=00 00 00 F1 Level=00 Type=04	Stopping of the resource on the single node failed.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”

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Message ID	Message text	Description	Recovery method	Reference Page
KAQK39602-E	Virtual Server error Detail=00 00 01 10 Level=00 Type=04	Failed to mount the file system of the displayed Virtual Server ID.	Ask the system administrator for the enabling or disabling of the local data encryption and the HCP payload encryption. If the local data encryption is enabled, ask the system administrator to confirm one of the system messages KAQM05256-E, KAQM05258-E to KAQM05264-E, KAQM05323-E, KAQM05325-W has not been output. In case the one of the messages has been output, ask the system administrator to take an appropriate action. If no message has been output, or the local data encryption and HCP payload encryption are disabled, refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.	"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"
	Virtual Server error Detail=00 00 01 11 Level=00 Type=04	Failed to unmount (umount) the file system of the displayed Virtual Server ID.	Refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.	"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"
	Virtual Server error Detail=00 00 01 20 Level=00 Type=04	Failed to start the NFS sharing of the displayed Virtual Server ID.	Refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.	"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"
	Virtual Server error Detail=00 00 01 21 Level=00 Type=04	Failed to terminate the NFS sharing of the displayed Virtual Server ID.	Refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.	"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"
	Virtual Server error Detail=00 00 01 30 Level=00 Type=04	Failed to make up the virtual IP of the displayed Virtual Server ID.	Refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.	"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"
	Virtual Server error Detail=00 00 01 31 Level=00 Type=04	Failed to make down the virtual IP of the displayed Virtual Server ID.	Refer to the failure recovery procedure of Troubleshooting "Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure" and recover the failure.	"Troubleshooting 'Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure' (TRBL 09-0000)"

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Message ID	Message text	Description	Recovery method	Reference Page
(Continued) KAQK39602-E	Virtual Server error Detail=00 00 01 40 Level=00 Type=04	Failed to start the CIFS service of the displayed Virtual Server ID.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	Virtual Server error Detail=00 00 01 41 Level=00 Type=04	Failed to stop the CIFS service of the displayed Virtual Server ID.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	Virtual Server error Detail=00 00 01 50 Level=00 Type=04	Failed to start the File snapshot of the displayed Virtual Server ID or the file version restore function.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	Virtual Server error Detail=00 00 01 51 Level=00 Type=04	Failed to stop the File snapshot of the displayed Virtual Server ID or the file version restore function.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	Virtual Server error Detail=00 00 01 F0 Level=00 Type=04	Failed to start the Virtual Server resources of the displayed Virtual Server ID.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”
	Virtual Server error Detail= 00 00 01 F1 Level=00 Type=04	Failed to stop the Virtual Server resources of the displayed Virtual Server ID.	Refer to the failure recovery procedure of Troubleshooting “Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure” and recover the failure.	“Troubleshooting ‘Chapter 9 Confirmation of Hardware Failure Recovery and Recovery Procedure for Software Failure’ (TRBL 09-0000)”

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Message ID	Message text	Description	Recovery method		Reference Page
KAQK39603-E	An attempt to connect user disk failed. (Detail=00 00 02 01 Level=00 Type=04)	Initialization process of the user disk failed.	Refer to the failure recovery procedure of Troubleshooting “9.2.3.1.3 Failure recovery of the blocked file system in the configuration connected to the disk array subsystem” and recover the failure.		“Troubleshooting ‘9.2.3.1.3 Failure recovery of the blocked file system in the configuration connected to the disk array subsystem’ (TRBL 09-0760)”
	An attempt to connect user disk failed. (Detail=00 00 02 02 Level=00 Type=04)	The configuration of user disk is invalid.	①	Execute fpstatus command, and reboot the OS if “Status” of all paths are “Online”. If any “Status” other than “Online” is included, proceed to step②.	“Maintenance Tool ‘2.5 Displaying the FC Status (fpstatus)’ (MNTT 02-0280)” “Maintenance Tool ‘2.29 Rebooting the OS of This Side Node (nasreboot)’ (MNTT 02-1790)”
			②	Refer to the failure recovery procedure of Troubleshooting “5.1 Determining FC Path Failures” and recover the failure.	“Troubleshooting ‘5.1 Determining FC Path Failures’ (TRBL 05-0000)”

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C.3.2 LCD Display Message Code

This is unsupported configuration in this mode.

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C.3.3 KAQX Messages

This page describes KAQX messages detected by HDI Single related with HCP Anywhere and the recovery methods.

Table C.3.3-1 Message IDs (KAQXxxxxx)

Message ID	Message text	Recovery method	Reference Page
KAQX10001-E	Internal disk failure (slot ID = *slot_ID*, status = *status*)	Execute hwstatus command and check [Internal HDD Information] to identify the failed drive. Replace the drive that determined as failed.	'B.3.1 Displaying the Hardware Status (hwstatus)' "Replacement '1.3.2 Replacing the Internal Hard Disk Drive (single node configuration)'(REP 01-0150)"
KAQX10013-E	File system blocked (*filesystem-name*)	Execute same troubleshooting as "KAQK39601-E(Single Node error Detail=00 00 00 10 Level=00 Type=04)" in 'C.3.1 SIM Messages'.	'C.3.1 SIM Messages Message IDs (KAQK39601-E)'
KAQX10014-E	A problem was detected in a fan. (fan_*fanID*)	Execute hwstatus command and check [Fan Information] to identify the failed fan unit. Replace the fan unit that determined as failed.	'B.3.1 Displaying the Hardware Status (hwstatus)' "Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)'(REP 01-0090)"
KAQX10016-E	A media error was detected with respect to the internal HDD. (slot number = *slot_number*)	Execute same troubleshooting as "KAQK37512-E" in 'C.3.1 SIM Messages'.	'C.3.1 SIM Messages Message IDs (KAQK37512-E)'
KAQX10017-E	The internal HDD detected a S.M.A.R.T. warning. (slot number = *slot_number*)	Execute same troubleshooting as "KAQK37514-E" in 'C.3.1 SIM Messages'.	'C.3.1 SIM Messages Message IDs (KAQK37514-E)'
KAQX10018-E	An attempt to start the NFS service failed.	Execute same troubleshooting as "KAQK39601-E(Single Node error Detail=00 00 00 20 Level=00 Type=04)" in 'C.3.1 SIM Messages'.	'C.3.1 SIM Messages Message IDs (KAQK39601-E)'
KAQX10019-E	An attempt to start the CIFS service failed.	Execute same troubleshooting as "KAQK39601-E(Single Node error Detail=00 00 00 40 Level=00 Type=04)" in 'C.3.1 SIM Messages'.	'C.3.1 SIM Messages Message IDs (KAQK39601-E)'
KAQX10021-E	An attempt to start the file version restore function failed.	Execute same troubleshooting as "KAQK39601-E(Single Node error Detail=00 00 00 50 Level=00 Type=04)" in 'C.3.1 SIM Messages'.	'C.3.1 SIM Messages Message IDs ((Continued) KAQK39601-E)'
KAQX10022-E	An attempt to start the resource group failed.	Execute same troubleshooting as "KAQK39601-E(Single Node error Detail=00 00 00 F0 Level=00 Type=04)" in 'C.3.1 SIM Messages'.	'C.3.1 SIM Messages Message IDs ((Continued) KAQK39601-E)'
KAQX10023-E	An inconsistency was detected in the user disk configuration. (slot number = *slot_number*)	Execute same troubleshooting as "KAQK39603-E(An attempt to connect user disk failed. (Detail=00 00 02 02 Level=00 Type=04)" in 'C.3.1 SIM Messages'.	'C.3.1 SIM Messages Message IDs (KAQK39603-E)'

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D.1 Replacing the Components

Table D.1-1 shows the parts to be replaced and the status of the OS operation to the node in replacement. The parts name of the hardware vendor is also shown in the following table because it must refer to "QuantaGrid Series D51B-2U Technical Guide" depends on the parts to be replaced.

Table 1-1 Parts to be Replaced and the Status of the OS Operation to the Node in Replacement (1/2)

No.	Component	QuantaGrid Series D51B-2U Technical Guide component name	Node configuration	Node OS operation status		Parts replacement	Approximate work time
				On (*1)	Off (*2)		
1	Power Supply unit	Power Supply unit	Cluster configuration	Y (*3)	Y	'D.1.1.1 Replacing the Power Supply Unit/ AC Cable (cluster configuration)'	30 minutes
			Single node configuration			'D.1.1.2 Replacing the Power Supply Unit/ AC Cable (single node configuration)'	
2	Fan unit	FAN Module	Cluster configuration	N	Y	'D.1.2.1 Replacing the Fan Unit (cluster configuration)'	30 minutes
			Single node configuration			'D.1.2.2 Replacing the Fan Unit (single node configuration)'	
3	Internal hard disk drive Solid State Drive (SSD) (*5)	Hard Disk Drive Assembly	Cluster configuration	Y (*3)	Y	'D.1.3.1 Replacing the Internal Hard Disk Drive (cluster configuration)'	90 minutes
			Single node configuration	Y (*4)		'D.1.3.2 Replacing the Internal Hard Disk Drive (single node configuration)'	
4	RAID Controller	Mezzanine	Cluster configuration	N	Y	'D.1.4.1 Replacing the RAID Controller (cluster configuration)'	30 minutes
			Single node configuration			'D.1.4.2 Replacing the RAID Controller (single node configuration)'	
5	Memory	Memory Modules	Cluster configuration	N	Y	'D.1.5.1 Replacing the Memory (cluster configuration)'	30 minutes
			Single node configuration			'D.1.5.2 Replacing the Memory (single node configuration)'	
6	Fibre Channel Card	Expansion Cards	Cluster configuration	N	Y	'D.1.6.1 Replacing the Fibre Channel Card (cluster configuration)'	60 minutes
			Single node configuration			'D.1.6.2 Replacing the Fibre Channel Card (single node configuration)'	
7	GbE-4Port Card 10GbE-1Port card 10GbE-2Port card	Expansion Cards	Cluster configuration	N	Y	'D.1.7.1 Replacing the GbE-4Port Card (cluster configuration)'	30 minutes
			Single node configuration			'D.1.7.2 Replacing the GbE-4Port Card (single node configuration)'	
8	GbE-2Port Card (*5)	OCP Mezzanine Board	Cluster configuration	N	Y	'D.1.8.1 Replacing the GbE-2Port Card (cluster configuration)'	30 minutes
			Single node configuration			'D.1.8.2 Replacing the GbE-2Port Card (single node configuration)'	

*1: The node is in operation.
*2: A failover to the other node was performed and user service has been continued.
*3: Only in the case of one target failed part, it can be replaced while the power is turned on (in the case of two failed parts, they need to be replaced while the power is turned off).
*4: In the case of one failed HDD(SSD) per 1RAID group, it can be replaced while the power is turned on (in the case of two failed HDDs(SSDs) per 1RAID group, they need to be replaced while the power is turned off). However, in the case of RAID6, even if the two failed HDDs(SSDs), they can be replaced while the power is turned on).
*5: Replace the SSD in the replacement procedure of the Internal hard disk drive. In addition, in the cluster configuration, it does not support the SSD.

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Table 1-1 Parts to be Replaced and the Status of the OS Operation to the Node in Replacement (2/2)

No.	Component	QuantaGrid Series D51B-2U Technical Guide component name	Node configuration	Node OS operation status		Parts replacement	Approximate work time
				On (*1)	Off (*2)		
9	Motherboard	Mainboard	Cluster configuration	N	Y	'D.1.9.1 Replacing the Motherboard (cluster configuration)'	50 minutes
			Single node configuration			'D.1.9.2 Replacing the Motherboard (single node configuration)'	
10	CPU	Processor	Cluster configuration	N	Y	'D.1.11.1 Replacing the CPU (cluster configuration)'	30 minutes
			Single node configuration			'D.1.11.2 Replacing the CPU (single node configuration)'	
11	Lithium Battery	Lithium Battery	Cluster configuration	N	Y	'D.1.15.1 Replacing the Lithium Battery (cluster configuration)'	30 minutes
			Single node configuration			'D.1.15.2 Replacing the Lithium Battery (single node configuration)'	
12	PCI Riser Board	PCIe Riser Board	Cluster configuration	N	Y	'D.1.16.1 Replacing the PCI Riser Board (cluster configuration)'	30 minutes
			Single node configuration			'D.1.16.2 Replacing the PCI Riser Board (single node configuration)'	
13	CPU Heat sink	Processor Heat Sink	Cluster configuration	N	Y	'D.1.17.1 Replacing the CPU Heatsink (cluster configuration)'	30 minutes
			Single node configuration			'D.1.17.2 Replacing the CPU Heatsink (single node configuration)'	
14	Internal RAID Battery	SuperCap	Cluster configuration	—	—	—	—
			Single node configuration	N	Y	'D.1.22 Replacing the Internal RAID Battery (single node configuration)'	30 minutes
15	SFP module (*7)	—	Cluster configuration	N	Y	'D.1.24.1 Replacing the SFP module (cluster configuration)'	10 minutes
			Single node configuration			'D.1.24.2 Replacing the SFP module (single node configuration)'	

*1: The node is in operation.
*2: A failover to the other node was performed and user service has been continued.
*6: OCP Mezzanine Board is the part to be replaced.
*7: Transceivers is the part to be replaced.

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D.1.1 Replacing the Power Supply Unit/ AC Cable

For the cluster configuration, refer to D.1.1.1 Replacing the Power Supply Unit/ AC Cable (cluster configuration). For the single node configuration, refer to ‘D.1.1.2 Replacing the Power Supply Unit/ AC Cable (single node configuration)’.

D.1.1.1 Replacing the Power Supply Unit/ AC Cable (cluster configuration)

Select either method:

Table D.1.1.1-1 Replacing a power supply unit

Method	Node status at replacement	Replacement procedure
1	The node is running.	(1) Replacement procedure while the node is in operation
2	The node is turned off.	(2) Replacement procedure while the node is turned off

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(1) Replacement procedure while the node is in operation

NOTE: When replacing AC cable, read the word of Power supply unit as AC cable.

(a) Check the hardware status. Check that “failed” is displayed for either 0 or 1 in “Power Supply Information” on the screen.
(For details about how to check the hardware status, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus.)’)
For the location of Power source slot where Power supply unit to be replace is mounted, refer to ‘A.2.2 Back side’. The Power source slot number is the value one (1) added to either zero (0) or one (1) of “Power Supply Information” confirmed above.

(b) Refer to “QuantaGrid Series D51B-2U Technical Guide” and replace the power supply unit.

NOTE: Precautions for parts replacement

- In accordance with the description in “QuantaGrid Series D51B-2U Technical Guide”, replace the power supply unit. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to ‘C.2.2.1 Failure determination procedure at the cluster configuration’ and determine the subject parts.

(c) Connect AC cable to the original location.
Refer to “QuantaGrid Series D51B-2U Technical Guide” and confirm that the status of power supply unit is normal.

(d) Check the hardware status. Check whether “ok” is displayed for both 0 and 1 of “Power Supply Information” on the screen.
(For details about how to check the hardware status, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus)’.)

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(2) Replacement procedure while the node is turned off

NOTE: When replacing AC cable, read the word of power supply unit as AC cable.

(a) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(b) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the power supply unit.

NOTE: Precautions for parts replacement
- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the power supply unit. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.1 Failure determination procedure at the cluster configuration' and determine the subject parts.

(c) Connect AC cable to the original location.
Refer to "QuantaGrid Series D51B-2U Technical Guide" and confirm that the status of power supply unit is normal.

NOTE: When there has been an instruction to let the heartbeat cable and maintenance port cable removed during operation before executing the replacement procedure, do not connect heartbeat cable and the maintenance port cable and just connect the other cables.

(d) This procedure is unnecessary when the node is started by connecting cables at (c).
Press the power button to turn on the power. Refer to "QuantaGrid Series D51B-2U Technical Guide" again and confirm that the status of power supply unit is normal.

(e) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (f).
If the login prompt window is displayed, proceed to the step (f).

(f) Confirm the node status on the other side.
To check, execute the peerstatus command on the other (normal) node and check whether the status is [BOOT COMPLETE]. For details about how to check node status, refer to "Maintenance Tool '2.36 Displaying the Status of Other Side Node (peerstatus)' (MNTT 02-2130)".

NOTE: Wait approximately 10 minutes until the OS is completely started.

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(g) Check the hardware status.
Check the hardware status. Check whether “ok” is displayed for both 0 and 1 of “Power Supply Information” on the screen.
For details about how to check the hardware status, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus)’.

(h) Return to the step (f) of “Replacement ‘1.1.1 Replacing the Power Supply Unit/ AC Cable (2) Replacement procedure while the node is turned off’ (REP 01-0040)”, and execute the rest of the procedures.

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D.1.1.2 Replacing the Power Supply Unit/ AC Cable (single node configuration)

Select either method:

Table D.1.1.2-1 Replacing a power supply unit

Method	Node status at replacement	Replacement procedure
1	The node is running.	(1) Replacement procedure while the node is in operation
2	The node is turned off.	(2) Replacement procedure while the node is turned off

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(1) Replacement procedure while the node is in operation

NOTE: When replacing AC cable, read the word of Power supply unit as AC cable.

(a) Check the hardware status. Check that “failed” is displayed for either 0 or 1 in “Power Supply Information” on the screen.
(For details about how to check the hardware status, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus.)’)
For the location of Power source slot where Power supply unit to be replace is mounted, refer to‘A.2.2 Back side’. The Power source slot number is the value one (1) added to either zero (0) or one (1) of “Power Supply Information” confirmed above.

(b) Refer to “QuantaGrid Series D51B-2U Technical Guide” and replace the power supply unit.

NOTE: Precautions for parts replacement

- In accordance with the description in “QuantaGrid Series D51B-2U Technical Guide”, replace the power supply unit. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to ‘C.2.2.2 Failure determination procedure at the single node configuration’ and determine the subject parts.

(c) Connect AC cable to the original location.
Refer to “QuantaGrid Series D51B-2U Technical Guide” and confirm that the status of power supply unit is normal.

(d) Check the hardware status. Check whether “ok” is displayed for both 0 and 1 of “Power Supply Information” on the screen.
(For details about how to check the hardware status, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus)’.)

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(2) Replacement procedure while the node is turned off

(a) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the power supply unit.

NOTE: Precautions for parts replacement

- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the power supply unit. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.2 Failure determination procedure at the single node configuration' and determine the subject parts.

(b) Connect AC cable to the original location.
Refer to "QuantaGrid Series D51B-2U Technical Guide" and confirm that the status of power supply unit is normal.

(c) This procedure is unnecessary when the node is started by connecting cables at (b).
Press the power button to turn on the power. Refer to "QuantaGrid Series D51B-2U Technical Guide" again and confirm that the status of power supply unit is normal.

(d) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (e).
If the login prompt window is displayed, proceed to the step (e).

NOTE: Wait approximately 10 minutes until the OS is completely started.

(e) Check if the resource group is running normally.
Execute rgstatus command to confirm whether the resource group is running normally.
For the method for confirmation, refer to "Maintenance Tool '2.63 Resource group Status Display (rgstatus)' (MNTT 02-3380)".

(f) Check the hardware status. Check whether "ok" is displayed for both 0 and 1 of "Power Supply Information" on the screen.
For details about how to check the hardware status, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

(g) Return to the step (d) of "Replacement '1.1.2 Replacing the Power Supply Unit/ AC cable (single node configuration) (2) Replacement procedure while the node is turned off' (REP 01-0060)" and execute the rest of the procedures.

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D.1.2 Replacing the Fan Unit

For the cluster configuration, refer to D.1.2.1 Replacing the Fan Unit (cluster configuration).
For the single node configuration, refer to 'D.1.2.2 Replacing the Fan Unit (single node configuration)'.

D.1.2.1 Replacing the Fan Unit (cluster configuration)

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the fan unit.

NOTE: Precautions for parts replacement
- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the fan unit. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.1 Failure determination procedure at the cluster configuration' and determine the subject parts.

(4) Reconnect all external cables disconnected before replacing the parts to the original locations. Press the power button on the node to turn on the power.

NOTE: When there has been an instruction to let the heartbeat cable and maintenance port cable removed during operation before executing the replacement procedure, do not connect heartbeat cable and the maintenance port cable and just connect the other cables.

(5) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (6). If the login prompt window is displayed, proceed to step (6).

(6) Confirm the node status on the other side.
To check, execute the peerstatus command on the other (normal) node and check whether the status is [BOOT COMPLETE].
For details about how to check node status, refer to "Maintenance Tool '2.36 Displaying the Status of Other Side Node (peerstatus)' (MNTT 02-2130)".

NOTE: Wait approximately 10 minutes until the OS is completely started.

(7) After the OS is started on the node, check the following item.
Check the hardware status. Check whether "ok" is displayed for all items of "FAN Information" on the screen. For details about how to check the hardware status, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

(8) Return to the step (e) of "Replacement '1.2.1 Parts replacement only when the node is turned off (cluster configuration)' (REP 01-0070)" and execute the rest of the procedures.

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D.1.2.2 Replacing the Fan Unit (single node configuration)

(1) Stop the OS on the target node.
Before stopping the OS of the node, ask the system administrator if the service can be stopped or not. After that confirmation, execute the operation.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to "QuantaGrid Series D51B-2U Technical Guide" and execute fan unit replacement.

NOTE: Precautions for parts replacement

- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the fan unit. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.2 Failure determination procedure at the single node configuration' and determine the subject parts.

(4) Reconnect all external cables disconnected before replacing the parts to the original locations. Press the power button on the node to turn on the power.

(5) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (6).
If the login prompt window is displayed, proceed to the step (6).

NOTE: Wait approximately 10 minutes until the OS is completely started.

(6) Check if the resource group is running normally.
Execute the rgstatus command to confirm whether the resource group is running normally. For the method for confirmation, refer to "Maintenance Tool '2.63 Resource group Status Display (rgstatus)' (MNTT 02-3380)".

(7) After the OS is started on the node, check the following.
Check the hardware status. Check whether "ok" is displayed for all items of "FAN Information" on the screen. (For checking the hardware status, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

(8) Return to the step (c) of "Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)' (REP 01-0090)" and execute the rest of the procedures.

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D.1.3 Replacing the Internal Hard Disk Drive

For the cluster configuration, refer to D.1.3.1 Replacing the Internal Hard Disk Drive (cluster configuration).
For the single node configuration, refer to 'D.1.3.2 Replacing the Internal Hard Disk Drive (single node configuration)'.

D.1.3.1 Replacing the Internal Hard Disk Drive (cluster configuration)

Select either method:

NOTE:
- Note that replacement of one internal hard disk drive must be performed while the node is in operation, and replacement of two internal hard disk drives must be performed while the node is turned off.
- Replacement of one internal hard disk drive is either failure replacement or preventive replacement.

Table D.1.3.1-1 Replacing internal hard disk drive

Method	Node status at replacement	Replacement procedure
1	The node is running (replacement of one internal HDD)	(1) Replacement procedure while the node is in operation (replacement of one internal HDD)
2	The node is turned off. (replacement of two internal HDDs)	(2) Replacement procedure while the node is turned off (replacement of two internal HDDs)

(1) Replacement procedure while the node is in operation (replacement of one internal HDD)

NOTE: Note that replacement of one internal hard disk drive must be performed while the node is in operation. It cannot be performed while the node is turned off.

(a) Check whether one of following SIM message is displayed. (Refer to "Maintenance Tool '2.6 Displaying SIMs on This Side (syseventlist)' (MNTT 02-0360)".)

- In the case of internal HDD failure, check the status of the hardware, and confirm the "InternalHDD Information" on the window shows "failed" in either of 12 and 13. (for the confirmation of the hardware, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

- In the case of internal HDD preventing replacement, check if "KAQK37512-E The number of internal RAID device media errors has exceeded the threshold.(internal_disk_number)" or "KAQK37514-E The number of internal RAID device S.M.A.R.T. warnings has exceeded the threshold (internal_disk_number)" is displayed on the window.
  The extension storage bay number for the HDD of the subject to be replaced becomes the value of internal_disk_number.
  For the location of installing the extension storage bay, refer to 'A.2.2 Back side'.

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(b) Refer to "Maintenance Tool '2.56 Status Information Acquisition of the Virtual Disk and the Physical Disk (state.sh)' (MNTT 02-3110)," and collect the status information of the current internal HDD.

(c) Refer to "Maintenance Tool '2.55 Embedded RAID Controller Internal Log Acquisition (log.sh)' (MNTT 02-3080)", and confirm the obtained log.

(d) Replace the internal hard disk drive in accordance with the procedure of "Solid-State Disk" in "QuantaGrid Series D51B-2U Technical Guide".

NOTE: Precautions for parts replacement
When replacing internal HDD, replace it with the instruction described in "QuantaGrid Series D51B-2U Technical Guide".

(e) Refer to "Maintenance Tool '2.58 Confirmation of Rebuilding Progress of Physical Disk (rbldchk.sh)' (MNTT 02-3170)", and confirm the rebuilding progress.

(f) After replacing the internal HDD, confirm the following items.

- Refer to "QuantaGrid Series D51B-2U Technical Guide" and confirm that the status of HDD is normal.

- In the case of internal HDD preventing replacement, check if "KAQK37513-I The number of internal RAID device media errors has been cleared. (internal_disk_number) " or "KAQK37515-I The number of internal RAID device S.M.A.R.T. warnings has been cleared (internal_disk_number) " is displayed on the window. (for the confirmation of the message, refer to "Maintenance Tool '2.6 Displaying SIMs on This Side (syseventlist)' (MNTT 02-0360)".

- Check the hardware status. Check whether "ok" is displayed for "InternalHDD Information" on the screen.
  For details about how to check the hardware status, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

The confirmation of the above items are all OK, the replacement procedure is complete.

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(2) Replacement procedure while the node is turned off (replacement of two internal HDDs)

(a) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(b) Replace the internal hard disk drive in accordance with the procedure of "Solid-State Disk" in "QuantaGrid Series D51B-2U Technical Guide".
The power source must be stopped because the new installation is done after the replacement.

NOTE: Precautions for parts replacement

- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the internal HDD. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.1 Failure determination procedure at the cluster configuration' and determine the subject parts.

(c) Execute newly installing the OS.
For the procedures, refer to "Set Up 'Chapter 3 New Installation' (SETUP 03-0000)".

(d) Perform settings after the installation is complete.
For the setting procedures, refer to "Set Up '5.1 Setting/ Confirmation after New Installation' (SETUP 05-0000)".

(e) Restore the OS.
For the procedures, refer to "Maintenance Tool '2.8 Recovering the Disk/Cluster Management LU (syslurestore)' (MNTT 02-0460)".

(f) Confirm that the OS startup of the node is completed.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (g.)
If the login prompt window is displayed, proceed to the step (g.)

(g) Confirm the node status on the other side.
To check, execute the peerstatus command on the other (normal) node and check whether the status is [BOOT COMPLETE].
For details about how to check node status, refer to "Maintenance Tool '2.36 Displaying the Status of Other Side Node (peerstatus)' (MNTT 02-2130)".

NOTE: Wait approximately 10 minutes until the OS is completely started.

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(h) After the OS is started on the node, check the following items.

- Refer to "QuantaGrid Series D51B-2U Technical Guide" and confirm that the status of HDD is normal.

- Check the hardware status. Check whether "ok" is displayed for "InternalHDD Information" on the screen.
  For details about how to check the hardware status, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

(i) Return to the step (f) of the "Replacement '1.3.1 Replacing the Internal Hard Disk Drive (2) Replacement procedure while the node is turned off (replacement of two internal HDDs)' (REP 01-0130)" and execute the rest of the procedures.

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D.1.3.2 Replacing the Internal Hard Disk Drive (single node configuration)

NOTE: If the RAID level check of the internal HDD has not been finished yet, check it in advance.
In case the node is in operation, refer to Internal HDD Information in 'B.3.1 Displaying the Hardware Status (hwstatus)' and check the number of failed HDDs and the location of expansion storage bay.
If there are 2 failed HDDs, specify --list" option for the vgrlist command and execute to confirm the displayed LU status (Refer to "Maintenance Tool '2.91 List of Volume Groups (vgrlist)' (MNTT 02-4460)".
If all displayed LU status is normal, refer to Table D.1.3.2-1. When displayed LU status has error, contact the Technical Support Center.

Execute the procedure by selecting one of the following methods:

Table D.1.3.2-1 Replacing a power supply unit

Method	Node status at replacement	Replacement procedure
1	The node is in operation. (in the case HDD to be replaced (*1) is any of the followings) ・1 HDD on the front side of the node ・1 HDD on the back side of the node ・1 HDD on the front side and 1 HDD on the back side of the node ・2 HDDs on the front side of the node (In case the all vgrlist command results, "LU status" are "normal".)	(1) Replacement procedure while the node is in operation
2	The node is turned off. (in the case HDD to be replaced (*1) is any of the followings) ・2 HDDs on the back side of the node	(2) Replacement procedure while the node is turned off

*1: For details of the location of HDD(s) to be replaced, refer to 'A.2.1 Front side' and 'A.2.2 Back side.'
"HDD on the front side of the node" in the table above indicates Extension storage bay from 0 to 11, and "HDD on the back side of the node" indicates Extension storage bay 12 and 13.

(1) Replacement procedure while the node is in operation

(a) Check whether one of following SIM message is displayed. (Refer to "Maintenance Tool '2.6 Displaying SIMs on This Side (syseventlist)' (MNTT 02-0360)".)

- In the case of internal HDD failure, check the status of the hardware, and confirm the "InternalHDD Information" on the window shows "failed" in either. (for the confirmation of the hardware, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.)

- In the case of internal HDD preventing replacement, check if "KAQK37512-E The number of internal RAID device media errors has exceeded the threshold. (internal_disk_number)" or "KAQK37514-E The number of internal RAID device S.M.A.R.T. warnings has exceeded the threshold. (internal_disk_number)" is displayed on the window.
The extension storage bay number for the HDD of the subject to be replaced becomes the value of internal_disk_number.
For the location of the extension storage bay, refer to 'A.2.1 Front side' and 'A.2.2 Back side.'

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(b) Refer to "Maintenance Tool '2.56 Status Information Acquisition of the Virtual Disk and the Physical Disk (state.sh)' (MNTT 02-3110)," and collect the status information of the current internal HDD.

(c) Refer to "Maintenance Tool '2.55 Embedded RAID Controller Internal Log Acquisition (log.sh)' (MNTT 02-3080)", and confirm the obtained log.

(d) Refer to "QuantaGrid Series D51B-2U Technical Guide" and execute internal hard disk drive replacement. If a failure occurs in 2 HDDs, replace 2 HDDs.
For the HDDs installed in the front of the node, replace HDDs in accordance with the procedure of "Hard Disk Drive Assembly" in "QuantaGrid Series D51B-2U Technical Guide". In that case, a tray needs to be removed and installed in new HDDs.
For the HDDs on the rear side of the node, replace HDDs in accordance with the procedure of "Solid-State Disk" in "QuantaGrid Series D51B-2U Technical Guide".

NOTE: Precautions for parts replacement
When replacing internal HDD, replace it with the instruction described in "QuantaGrid Series D51B-2U Technical Guide".

(e) Refer to "Maintenance Tool '2.58 Confirmation of Rebuilding Progress of Physical Disk (rbldchk.sh)' (MNTT 02-3170)", and confirm the rebuilding progress.

NOTE: Depending on the configuration of the disk drive, it may take several hours to complete rebuild. If maintenance personnel cannot wait for the completion for certain reasons of the customer, click the [Esc] key to stop the command and ask the customer to confirm the completion of rebuild.
In that case, the customer can confirm completion of rebuild from hardware status of the internal HDD on maintenance GUI. In the case rebuild is in progress, "Rebuild" is displayed, and in the case rebuild is completed, "Normal" is displayed.
If the customer performs the confirmation, be sure to ask them not to turn off the power until rebuild is completed.

(f) After replacing the internal HDD, confirm the following items.

- Refer to "QuantaGrid Series D51B-2U Technical Guide" and confirm that the status of HDD is normal.

- In the case of internal HDD preventing replacement, check if "KAQK37513-I The number of internal RAID device media errors has been cleared. (internal_disk_number) " or "KAQK37515-I The number of internal RAID device S.M.A.R.T. warnings has been cleared. (internal_disk_number) " is displayed on the window. (For the confirmation of the message, refer to "Maintenance Tool '2.6 Displaying SIMs on This Side (syseventlist)' (MNTT 02-0360)".

- Check the hardware status. Check whether "ok" is displayed for "InternalHDD Information" on the screen.
For details about how to check the hardware status, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

The confirmation of the above items are all OK, the replacement procedure is complete.

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(2) Replacement procedure while the node is turned off

(a) Replace the internal hard disk drive in accordance with the procedure of "Solid-State Disk" in "QuantaGrid Series D51B-2U Technical Guide".

NOTE: Precautions for parts replacement

- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the internal HDD. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.2 Failure determination procedure at the single node configuration' and determine the subject parts.

(b) The procedure differs depending on the configuration.
In case of the configuration using management port, refer to the procedure in Table D.1.3.2-2.
In case of the configuration using trunk 2 Data ports, ask the system administrator for the location of a free port of the IP-SW which the customer configures. Then, refer to the following tables depending on the case.

- If IP-SW has a free port, refer to Table D.1.3.2-3
- If IP-SW does not have a free port, refer to Table D.1.3.2-4

After completing the all referenced recovery procedure, proceed to the procedure (c).

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Table D.1.3.2-2 Failure recovery procedures in the configuration using management port

#	Process	Performed by	Reference
1	Execute a new OS installation (*1)	Maintenance personnel	"Set up 'Chapter 3 New Installation' (SETUP 03-0000)"
2	Set after completing the installation	Maintenance personnel	"Set up '5.1 Setting/Confirmation after New Installation' (SETUP 05-0000)"
3	Execute the OS data recovery	System administrator	—
4	Confirm that no error message related to the file system or the file sharing is output	System administrator	—
5	In the configuration of HDI for Cloud, confirm if the file configuration is consistent between the HDI and the HCP after performing the restoration by executing the CLI command open to the system administrator.	System administrator	—
6	Request I/O confirmation for the system	System administrator	—

*1: When selecting the user data initialization on the initial installation, KAQM35001-E, KAQM35003-E, and KAQM35007-E messages are output after the initial installation and before the restoration of the system LU, but continue the recovery procedures; you do not need to take measures for the messages.

Table D.1.3.2-3 Failure recovery procedures in the Configuration using trunk 2 Data ports (Free Port is Available in IP-SW)

#	Process	Performed by	Reference
1	Confirm with the system administrator the free port of the IP-SW which the customer configures, and connect the confirmed port and the management port of the node by the LAN cable. Connect the free port confirmed with the system administrator and the management port of the node by the LAN cable.	Maintenance personnel	—
2	Execute a new OS installation (*1)	Maintenance personnel	"Set up 'Chapter 3 New Installation' (SETUP 03-0000)"
3	Set after completing the installation (Set the IP address and the Routing that are used at the front-end LAN for the management port IP address. The IP address and the Routing that are used at the front-end LAN should be confirmed with the system administrator.)	Maintenance personnel	"Set up '5.1 Setting/Confirmation after New Installation' (SETUP 05-0000)"
4	Execute the OS data recovery.	System administrator	—
5	After completing the recovery, remove the LAN cable connected to the management port.	Maintenance personnel	—
6	Confirm that no error message related to the file system or the file sharing is output	System administrator	—
7	In the configuration of HDI for Cloud, confirm if the file configuration is consistent between the HDI and the HCP after performing the restoration by executing the CLI command open to the system administrator.	System administrator	—
8	Request I/O confirmation for the system	System administrator	—

*1: When selecting the user data initialization on the initial installation, KAQM35001-E, KAQM35003-E, and KAQM35007-E messages are output after the initial installation and before the restoration of the system LU, but continue the recovery procedures; you do not need to take measures for the messages.

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Table D.1.3.2-4 Failure recovery procedures (Free Port is Not Available in IP-SW)

#	Process	Performed by	Reference
1	Disable VLAN/Link aggregation settings of IP-SW port which connecting to a node (ask the system administrator to leave a note of the settings so that the settings can be restored.).	System administrator	—
2	Remove a LAN cable from a node data port which is connecting to the IP-SW port which disabled at the above step #1 and reconnect to the management port (*2).	Maintenance personnel	—
3	Execute the initial OS installation (*1)	Maintenance personnel	"Set up 'Chapter 3 New Installation' (SETUP 03-0000)"
4	Set after completing the installation.	Maintenance personnel	"Set up '5.1 Setting/Confirmation after New Installation' (SETUP 05-0000)"
5	Execute the OS data recovery (*2).	System administrator	—
6	After the completion of failure recovery, put the LAN cable which was reconnected at the above step #2 back to the original data port.	Maintenance personnel	—
7	Restore the IP-SW settings (VLAN/Link aggregation) changed at the above step #1 .	System administrator	—
8	Confirm that no error message related to the file system or the file sharing is output	System administrator	—
9	In the configuration of HDI for Cloud, confirm if the file configuration is consistent between the HDI and the HCP after performing the restoration by using the CLI command open to the system administrator.	System administrator	—
10	Request I/O confirmation for the system	System administrator	—

*1: When selecting the user data initialization on the initial installation, KAQM35001-E, KAQM35003-E, and KAQM35007-E messages are output after the initial installation and before the restoration of the system LU, but continue the recovery procedures; you do not need to take measures for the messages.

*2: KAQG81003-W is output after rebooting at the time of the system LU recovery. However no particular action is required. Continue the recovery procedure.

(c) Check if the resource group is running normally.
Execute the rgstatus command to confirm whether the resource group is running normally. For the method for confirmation, refer to "Maintenance Tool '2.63 Resource group Status Display (rgstatus)' (MNTT 02-3380)".

(d) After replacing the internal HDD, confirm the following items.

- Refer to "QuantaGrid Series D51B-2U Technical Guide" and confirm that the status of HDD is normal.
- Check the hardware status. Check whether "ok" is displayed for "InternalHDD Information" on the screen.
  For details about how to check the hardware status, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

If the confirmation of the above items are all OK, the replacement procedure is complete.

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D.1.4 Replacing the RAID Controller

For the cluster configuration, refer to D.1.4.1 Replacing the RAID Controller (cluster configuration).
For the single node configuration, refer to 'D.1.4.2 Replacing the RAID Controller (single node configuration)'.

D.1.4.1 Replacing the RAID Controller (cluster configuration)

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the RAID controller.

NOTE: Precautions for parts replacement

- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the RAID controller. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.1 Failure determination procedure at the cluster configuration' and determine the subject parts.
- Write mode before replacement is taken over to the write mode after replacement. Write through will be set in VD0 (OS LU).
- When replacing RAID Controller, put the node back to the rack after removing Fibre Channel Card. Install Fibre Channel Card again after setting BIOS.
  For how to remove Fibre Channel Card, refer to "QuantaGrid Series D51B-2U Technical Guide".

(4) Check the BIOS version and the FW version. Refer to 'B.2.6.3 RAID controller setting procedure (1)'.
If the version is not the specified version as the result of the confirmation, use the tool to change the version.
For the details, contact the Technical Support Center.
Go to step (5) after changing to the specified version.

(5) Change the settings of RAID controller.
Refer to 'B.2.8 Virtual Drive Consistency Checking Procedure (2)' to disable the schedule of Consistency Check. Also, change the settings of RAID controller with reference to 'B.2.6.3 RAID controller setting procedure (2)'.

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(6) Install Fibre Channel Card.
For how to install Fibre Channel Card, refer to "QuantaGrid Series D51B-2U Technical Guide".

(7) Confirm that a node failure is not displayed in Event Log and Sensor Readings using MegaRAC GUI.
Other parts might be replaced depending on the confirmation result of Event Log and Sensor Readings.
In this case, return to 'C.2.2.1 Failure determination procedure at the cluster configuration' and determine the part to be replaced.

(8) Reconnect all external cables disconnected before replacing the parts to the original locations. Press the power button on the node to turn on the power.

NOTE: When there has been an instruction to let the heartbeat cable and maintenance port cable removed during operation before executing the replacement procedure, do not connect heartbeat cable and the maintenance port cable and just connect the other cables.

(9) Confirm that the OS startup of the node is completed.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (10).
If the login prompt window is displayed, proceed to the step (10).

(10) Check status of the other node.
To check, execute the peerstatus command on the other (normal) node and check whether the status is [BOOT COMPLETE].
For details about how to check node status, refer to "Maintenance Tool '2.36 Displaying the Status of Other Side Node (peerstatus)' (MNTT 02-2130)".

NOTE: Wait approximately 10 minutes until the OS is completely started.

(11) Return to the step (e) of "Replacement '1.2.1 Parts replacement only when the node is turned off (cluster configuration)' (REP 01-0070)" and execute the rest of the procedures.

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D.1.4.2 Replacing the RAID Controller (single node configuration)

(1) Stop the OS on the target node.
Before stopping the OS of the node, ask the system administrator if the service can be stopped or not. After that confirmation, execute the operation.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".
If it is not possible to stop the OS by executing nasshutdown command, press the power button a little longer.

(2) Start OS with the maintenance mode and collect a log.
Perform the all procedures described in "Maintenance Tool '2.19.2 (2) Collecting log files in maintenance mode' (MNTT 02-1330)" and forward the log file to the maintenance PC.
Send the collected log to the Technical Support Center and request them to check whether the log needs the consistency check in Step (8).

(3) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(4) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the RAID controller.

NOTE: Precautions for parts replacement

- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the RAID controller. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.2 Failure determination procedure at the single node configuration' and determine the subject parts.
- Write mode before replacement is taken over to the write mode after replacement. Write through will be set in VD0 (OS LU) and VD1 (CM LU), Write back will be set in VDx ("x" is a value more than 1) (User LU).

(5) Reconnect all external cables disconnected before replacing the parts to the original locations.

(6) Check the BIOS version and the FW version. Refer to 'B.2.6.3 RAID controller setting procedure (1)'.
If the version is not the specified version as the result of the confirmation, use the tool to change the version.
For the details, contact the Technical Support Center.
Go to step (7) after changing to the specified version.

(7) Change the settings of RAID controller.
Refer to 'B.2.8 Virtual Drive Consistency Checking Procedure (2)' to disable the schedule of Consistency Check. Also, change the settings of RAID controller with reference to 'B.2.6.3 RAID controller setting procedure (2)'.

(8) If it is the preventive replacement, this step is not required. Skip (8) and go to (9). If the replacement is due to the failure, As the result of the enquiry stated in step (2), if the consistency check is required, refer to 'B.2.8 Virtual Drive Consistency Checking Procedure' to perform the consistency check (*1). Execute the following procedure.
If it is not the preventive replacement, go to step (9).

*1: It may take a long time to check depending on the size of the user LU.

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(9) Turn on the power button to confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (10).
If the login prompt window is displayed, proceed to the step (10).

NOTE: Wait approximately 10 minutes until the OS is completely started.

(10) If it is the preventive replacement, this step is not required. Skip (10) and go to (11). If the replacement is due to the failure, execute the following procedure.

Check the output SIM.
Execute syseventlist command to check whether either of SIMs in Table D.1.4.2-1 is output. For details, refer to "Maintenance Tool '2.6 Displaying SIMs on This Side (syseventlist)' (MNTT 02-0360.)"
When either of SIMs is output, write down the SIM ID and the Detail Code.
When neither of SIMs is output, request the system administrator to delete and re-create the file system and restore the user data.

Table D.1.4.2-1 SIM List to Check Output

#	SIM message ID	Detail Code	Description
1	KAQK39500-E	00 00 00 02	A user file system is blocked.
2	KAQK37524-W	All the code	A cache backup module failure was detected.

(11) Confirm that the resource group is operated normally.
Execute rgstatus command to confirm that the resource group is operating normally. Refer to "Maintenance Tool '2.63 Resource group Status Display (rgstatus)' (MNTT 02-3380)" for the method of the confirmation.

(12) When a consistency check is scheduled, inform the system administrator that the replaced RAID controller needs to have rescheduling. Also, inform the scheduling should be executed after the maintenance operation.

(13) Return to step (c) of "Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)' (REP 01-0090)" and execute the rest of the procedures.

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D.1.5 Replacing the Memory

For the cluster configuration, refer to D.1.5.1 Replacing the Memory (cluster configuration).
For the single node configuration, refer to ‘D.1.5.2 Replacing the Memory (single node configuration)’.

D.1.5.1 Replacing the Memory (cluster configuration)

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to “Maintenance Tool ‘2.28 Terminating the OS of This Side Node (nasshutdown)’ (MNTT 02-1740)”.

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to “QuantaGrid Series D51B-2U Technical Guide” and replace the memory.

NOTE: Precautions for parts replacement
- In accordance with the description in “QuantaGrid Series D51B-2U Technical Guide”, replace the memory. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to ‘C.2.2.1 Failure determination procedure at the cluster configuration’ and determine the subject parts.

(4) Reconnect all external cables disconnected before replacing the parts to the original locations. Press the power button on the node to turn on the power.

NOTE: When there has been an instruction to let the heartbeat cable and maintenance port cable removed during operation before executing the replacement procedure, do not connect heartbeat cable and the maintenance port cable and just connect the other cables.

(5) Confirm that the OS startup of the node is complete.
Refer to “Set Up ‘1.3 Startup Confirmation of the OS by using KVM’ (SETUP 01-0010)” and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to ‘C.2.4 Diagnosis for OS Boot Failure’ and execute the solution to the failure. After the failure is solved, proceed to the step (6). If the login prompt window is displayed, proceed to step (6).

(6) Confirm the node status on the other side.
To check, execute the peerstatus command on the other side (normal) node and check whether the status is [BOOT COMPLETE].
For details about how to check node status, refer to “Maintenance Tool ‘2.36 Displaying the Status of Other Side Node (peerstatus)’ (MNTT 02-2130)”.

NOTE: Wait approximately 10 minutes until the OS is completely started.

(7) After the OS is started on the node, check the hardware status. Confirm whether “installed” is displayed for the status of where the memory replacement was executed in “Memory Information” on the screen. (For details about how to check the hardware status, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus)’.)

(8) Return to the step (e) of “Replacement ‘1.2.1 Parts replacement only when the node is turned off (cluster configuration)’ (REP 01-0070)”and execute the rest of procedures.

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D.1.5.2 Replacing the Memory (single node configuration)

(1) Stop the OS on the target node.
Before stopping the OS of the node, ask the system administrator if the service can be stopped or not. After that confirmation, execute the operation.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the memory.

NOTE: Precautions for parts replacement

- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the memory. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.2 Failure determination procedure at the single node configuration' and determine the subject parts.

(4) Reconnect all external cables disconnected before replacing the parts to the original locations. Press the power button on the node to turn on the power.

(5) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (6). If the login prompt window is displayed, proceed to step (6).

NOTE: Wait approximately 10 minutes until the OS is completely started.

(6) Check if the resource group is running normally.
Execute the rgstatus command to confirm whether the resource group is running normally. For the method for confirmation, refer to "Maintenance Tool '2.63 Resource group Status Display (rgstatus)' (MNTT 02-3380)".

(7) After the OS is started on the node, check the hardware status. Confirm whether "installed" is displayed for the status of where the memory replacement was executed in "Memory Information" on the screen. (For details about how to check the hardware status, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.)

(8) Return to the step (c) of "Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)' (REP 01-0090)" and execute the rest of procedures.

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D.1.6 Replacing the Fibre Channel Card

For the cluster configuration, refer to D.1.6.1 Replacing the Fibre Channel Card (cluster configuration).
For the single node configuration, refer to ‘D.1.6.2 Replacing the Fibre Channel Card (single node configuration)’.

D.1.6.1 Replacing the Fibre Channel Card (cluster configuration)

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to “Maintenance Tool ‘2.28 Terminating the OS of This Side Node (nasshutdown)’ (MNTT 02-1740)”.
When replacing FC card due to occurrence of cluster management LU failure or the both paths failures of the target node, execute nasshutdown command with “—force” option attached.
When the setting of host group security mode is enabled, execute the operation from the step (2).
When the setting of host group security mode is disabled, execute the operation from the step (3).

(2) Record WWNs corresponding to the both FC ports of the ordered service part because changing the WWNs is required after replacing parts.
- The Fibre Channel card has one WWN corresponding to the “PORT 0” and the other WWN corresponding to the “PORT 1”, which are written after the “IEEE ADDRESS” in the back of the card. Make sure you clearly identify the WWN of each port.
- A port with smaller port name is “PORT 0.”
(e.g., when the port names are fc0002 and fc0003, fc0002 is “PORT 0.”)
- Each WWN written on the Fibre Channel card consists of 12 digits and the first four digits (1000) are omitted. Therefore, when you record a WWN, add 1000 at the beginning and make sure the WWN is 16 digits.

(3) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

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(4) Refer to “QuantaGrid Series D51B-2U Technical Guide” and replace the Fibre Channel card.
After the replacement, the power source must be stopped because the connection of Fibre Channel cable and the setting of the host group security are required to be set.

NOTE: Precautions for parts replacement

- In accordance with the description in “QuantaGrid Series D51B-2U Technical Guide”, replace the Fibre Channel card. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to ‘C.2.2.1 Failure determination procedure at the cluster configuration’ and determine the subject parts.

(5) Check the BIOS version and the FW version. Refer to ‘B.2.9 (3) Confirming HBA version ’.
If the version is not the specified version as the result of the confirmation, use the tool to change the version.
For the details, contact the Technical Support Center.
Go to step (6) after changing to the specified version.

(6) When the setting of host group security mode is enabled, write down the WWNs of the parts that are removed at the step (4).
When the setting of the host group security mode is disabled, execute the operation from the step (7).

NOTE: In the case of Emulex HBA, each WWN written on the Fibre Channel card consists of 12 digits and the first four digits (1000) are omitted. Therefore, when you record a WWN, add 1000 at the beginning and make sure the WWN is 16 digits.

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(7) To change the WWNs registered to the connection ports on the disk array subsystem, refer to "LUN Manager User's Guide" for the AMS2000 series or HUS100 series, and if USP V, USP VM, VSP, VSP G1000, or HUS VM is connected, refer to "5.3.1.4. LUN Management" in the installation section of the maintenance manual of each system, and if VSP Gx00/VSP Fx00 is connected, refer to "System Administrator Guide" for VSP Gx00/VSP Fx00. To change the WWNs, delete the WWNs recorded in step (6) and then register the WWNs recorded in step (2).
Change the WWN registered for each connection destination port.

(8) After completion of step (7), if the FC-SW is not used, skip this step. If the FC-SW is used, request the system administrator to change the FC-SW WWN zoning by deleting the WWN that you took a note of in step (6) and registering the WWN that you took a note of in step (2).

(9) Reconnect all external cables disconnected before replacing the parts to the original locations. Press the power button on the node to turn on the power.

NOTE: When there has been an instruction to let the heartbeat cable and maintenance port cable removed during operation before executing the replacement procedure, do not connect heartbeat cable and the maintenance port cable and just connect the other cables.

(10) After the OS is started, log in the node from the maintenance PC. It normally takes approximately 10 minutes until the OS is completely started.
For the login, refer to "Maintenance Tool '1.3.2 Logging in to a node for executing commands' (MNTT 01-0200)".

NOTE: You can log in the node from the maintenance PC even if communication with the array was not restored after the FC card replacement. However, in that case, do not execute the commands that affect cluster operation such as clstatus command, etc.

(11) Confirm that the port of Fibre Channel card linked up.
- Check the LED statuses on the new Fibre Channel card. Make sure at least one port is linked up.
  For the details of LED, contact the Technical Support Center.

(12) Execute fpstatus command. If "Status" of both paths is "Error", do not execute the rest of the procedures, return to Troubleshooting where you were originally referring to and execute the rest of the procedures there.
For the fpstatus command, refer to "Maintenance Tool '2.5 Displaying the FC Status (fpstatus)' (MNTT 02-0280)".

(13) Return to the step (e) of "Replacement '1.2.1 Parts replacement only when the node is turned off (cluster configuration)' (REP 01-0070)", and execute the rest of the procedures.

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D.1.6.2 Replacing the Fibre Channel Card (single node configuration)

This is not a part to be replaced.

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D.1.7 Replacing the GbE-4Port Card

For the cluster configuration, refer to D.1.7.1 Replacing the GbE-4Port Card (cluster configuration).
For the single node configuration, refer to 'D.1.7.2 Replacing the GbE-4Port Card (single node configuration)'.

D.1.7.1 Replacing the GbE-4Port Card (cluster configuration)

NOTE:
- 10GbE-1Port card is not supported for this model.
- When replacing 10GbE-2Port card, read "GbE-4Port card" as "10GbE-2Port card."

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the GbE-4Port card.
After the replacement, the power source must be stopped because the cables are required to be connected.

NOTE: Precautions for parts replacement
- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the GbE-4Port card. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.1 Failure determination procedure at the cluster configuration' and determine the subject parts.

(4) After replacing the GbE-4Port card, reconnect the cables where they were if they are all removed at the replacing procedure, and press the power button on the node.
Reconnect all external cables disconnected before replacing the parts to the original locations. Press the power button on the node to turn on the power.

NOTE: Be sure to reconnect the LAN cables to the same ports as before.

(5) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (6).
If the login prompt window is displayed, proceed to the step (6).

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(6) Confirm the node status on the other side.
To check, execute the peerstatus command on the other (normal) node and check whether the status is [BOOT COMPLETE].
For details about how to check node status, refer to "Maintenance Tool '2.36 Displaying the Status of Other Side Node (peerstatus)' (MNTT 02-2130)".

NOTE: Wait approximately 10 minutes until the OS is completely started.

(7) After the OS is started, check the following.
Check the hardware status. Check whether "up" is displayed for the ports used in the new card in "Network Interface" on the screen. For details about how to check the hardware status, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

(8) Return to the step (e) of "Replacement '1.2.1 Parts replacement only when the node is turned off (cluster configuration)' (REP 01-0070)" and execute the rest of the procedures.

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D.1.7.2 Replacing the GbE-4Port Card (single node configuration)

NOTE:
- 10GbE-1Port card is not supported for this model.
- When replacing 10GbE-2Port card, read “GbE-4Port card” as “10GbE-2Port card.”

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to “Maintenance Tool ‘2.28 Terminating the OS of This Side Node (nasshutdown)’ (MNTT 02-1740)”.

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to “QuantaGrid Series D51B-2U Technical Guide” and replace the GbE-4Port card.
After the replacement, the power source must be stopped because the cables are required to be connected.

NOTE: Precautions for parts replacement
- In accordance with the description in “QuantaGrid Series D51B-2U Technical Guide”, replace the GbE-4Port card. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to ‘C.2.2.2 Failure determination procedure at the single node configuration’ and determine the subject parts.

(4) Reconnect all external cables disconnected before replacing the parts to the original locations. Press the power button on the node to turn on the power.

(5) Confirm that the OS startup of the node is complete.
Refer to “Set Up ‘1.3 Startup Confirmation of the OS by using KVM’ (SETUP 01-0010)” and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to ‘C.2.4 Diagnosis for OS Boot Failure’ and execute the solution to the failure. After the failure is solved, proceed to the step (6).
If the login prompt window is displayed, proceed to the step (6).

(6) Check if the resource group is running normally.
Execute rgstatus command to confirm whether the resource group is running normally.
For the method for confirmation, refer to “Maintenance Tool ‘2.63 Resource group Status Display (rgstatus)’ (MNTT 02-3380)”.

(7) After the OS is started, check the following.
- Check the hardware status. Check that “up” is displayed in “Network Interface” on the screen as the status of the port which is used by the replaced card. For details about how to check the hardware status, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus)’.

(8) Return to the step (c) of “Replacement ‘1.2.2 Parts replacement only when the node is turned off (single node configuration)’ (REP 01-0090)” and execute the rest of the procedures.

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D.1.8 Replacing the GbE-2Port Card

Replace the OCP mezzanine.

For the cluster configuration, refer to D.1.8.1 Replacing the GbE-2Port Card (cluster configuration).
For the single node configuration, refer to 'D.1.8.2 Replacing the GbE-2Port Card (single node configuration)'.

D.1.8.1 Replacing the GbE-2Port Card (cluster configuration)

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the OCP mezzanine.
After the replacement, the power source must be stopped because the cables are required to be connected.

NOTE: Precautions for parts replacement

- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the OCP mezzanine. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.1 Failure determination procedure at the cluster configuration' and determine the subject parts.

(4) After replacing the OCP mezzanine, reconnect the cables where they were if they are all removed at the replacing procedure. After reconnect the cables, turn on the power button.
Reconnect all external cables disconnected before replacing the parts to the original locations. Press the power button on the node to turn on the power.

NOTE: When there is an instruction to let the reset port cable removed during operation, do not connect the reset port cable.

(5) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (6).
If the login prompt window is displayed, proceed to the step (6).

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(6) Confirm the node status on the other side.
To check, execute the peerstatus command on the other (normal) node and check whether the status is [BOOT COMPLETE].
For details about how to check node status, refer to "Maintenance Tool '2.36 Displaying the Status of Other Side Node (peerstatus)' (MNTT 02-2130)".

NOTE: Wait approximately 10 minutes until the OS is completely started.

(7) After the OS is started, check the following.
Check the hardware status.
Check that "up" is displayed in "Network Interface" on the screen as the status of the port which is used by the replaced card.
For details about how to check the hardware status, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

(8) Return to the step (e) of "Replacement '1.2.1 Parts replacement only when the node is turned off (cluster configuration)' (REP 01-0070)" and execute the rest of the procedures.

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D.1.8.2 Replacing the GbE-2Port Card (single node configuration)

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the OCP mezzanine.
After the replacement, the power source must be stopped because the cables are required to be connected.

NOTE: Precautions for parts replacement

- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the OCP mezzanine. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.2 Failure determination procedure at the single node configuration' and determine the subject parts.

(4) Reconnect all external cables disconnected before replacing the parts to the original locations. Press the power button on the node to turn on the power.

(5) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (6).
If the login prompt window is displayed, proceed to the step (6).

(6) Check if the resource group is running normally.
Execute rgstatus command to confirm whether the resource group is running normally.
For the method for confirmation, refer to "Maintenance Tool '2.63 Resource group Status Display (rgstatus)' (MNTT 02-3380)".

(7) After the OS is started, check the following.

- Check the hardware status. Check that "up" is displayed in "Network Interface" on the screen as the status of the port which is used by the replaced card. For details about how to check the hardware status, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

(8) Return to the step (c) of "Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)' (REP 01-0090)" and execute the rest of the procedures.

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D.1.9 Replacing the Motherboard

For the cluster configuration, refer to D.1.9.1 Replacing the Motherboard (cluster configuration).
For the single node configuration, refer to 'D.1.9.2 Replacing the Motherboard (single node configuration)'.

D.1.9.1 Replacing the Motherboard (cluster configuration)

NOTE:
- Prior to the replacement of the motherboard stated in this section, a confirmation whether the SIM message (KAQG72026-E) for the forced failover has been output to the other side of the node or not, needs to be finished.
  If the confirmation has not been finished yet, check the SIM message on the other side of the node and also if the message "KAQG72026-E" has been output, execute 'C.2.2.1 Failure determination procedure at the cluster configuration' again. For the confirmation of SIM message, refer to "Maintenance Tool '2.6 Displaying SIMs on This Side (syseventlist)' (MNTT 02-0360)".
- BMC setting must be the same before the replacement of the motherboard because the communication might not be available if the different BMC setting is done.

(1) The replacement of the motherboard requires confirming and resetting the BMC. Therefore, confirm the BMC setting information, and write down the setting information. For the confirmation of the BMC setting, execute bmcctl command. If it is not available to log in to the node to be replaced, execute from the other side node. For more information about bmcctl command, refer to "Maintenance Tool '2.18 Setting BMC LAN Information (bmcctl)' (MNTT 02-1210)".

(2) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(3) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(4) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the motherboard.
After replacing it, reconnect all the cables except for network cables.

NOTE: Precautions for parts replacement
- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the motherboard.
- When replacing the motherboard, do not install Fibre Channel Card in the motherboard again. Put the node back to the rack without installing Fibre Channel Card. Install Fibre Channel Card after setting BIOS.
- After putting the node back to the rack, only reconnect the AC cable disconnected in step (3). Do not reconnect other external cables until an instruction is given.

(5) Open the remote console window.
For connecting the remote console, refer to 'B.1 Connection and Confirmation of OS Console.'

NOTE: On the motherboard of the maintenance parts, DHCP of BMC interface is enabled.
DHCP of BMC interface on the motherboard of the maintenance PC is enabled.
It takes one to two minutes until the default IP address (192.168.0.120) is set automatically after the power is supplied to the node in step (4).

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(6) Confirm the BIOS version and the BMC Firmware Revision.
Refer to 'B.2 BIOS setting Table B.2-1 List of BIOS Setting Items of Motherboard 1'.
If the BIOS version and the BMC Firmware Revision are not the specified version or revision as the result of the confirmation, use the tool to change the version or revision. For the details, contact the Technical Support Center. After changing to the specified version or revision, perform the procedure from step (5) again.

(7) Change BMC network configuration.
Disable DHCP of IPv4. Also change BMC setting written down in step (1).
Also disable IPv6. For the details, refer to "QuantaGrid Series D51B-2U Technical Guide".

(8) Perform the settings of PSU2. For the details, refer to 'B.2.9 (2) Setting of Power supply unit'.

(9) Perform the BIOS setting of the motherboard. For the details, refer to 'B.2 BIOS setting Table B.2-1 List of BIOS Setting Items of Motherboard 2'.

(10) Install Fibre Channel Card.
For how to install Fibre Channel Card, refer to "QuantaGrid Series D51B-2U Technical Guide".

(11) Confirm that an error of node is not displayed in Event Log and Sensor Readings using MegaRAC GUI.
Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
In this case, return to 'C.2.2.1 Failure determination procedure at the cluster configuration' and determine the part to be replaced.

(12) Reconnect all external cables disconnected before replacing the parts to the original locations. Press the power button on the node to turn on the power.

NOTE: When there has been an instruction to let the heartbeat cable and maintenance port cable removed during operation before executing the replacement procedure, do not connect heartbeat cable and the maintenance port cable and just connect the other cables.

(13) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (14).
If the login prompt window is displayed, proceed to the step (14).

(14) Check the information of the BMC interface. Check if the information is not changed with the written information before replacing the motherboard.
If the information has been changed, set to the information as the written information before replacing the mother board again.
For the setting of the BMC interface information, refer to "Maintenance Tool '2.18 Setting BMC LAN Information (bmcctl)' (MNTT 02-1210)".

NOTE: If the operation instruction to remove heartbeat cable and management cable has been given in the Troubleshooting / Troubleshooting by each Model of this manual prior to the execution of the replacement procedure, confirmation and setting f the BMC interface information are not required. They will be executed in the Troubleshooting section.

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(15) Execute the timeget command in the both node with no option specifying, and check that the present time matches in the both nodes. For the confirmation of the present time, make sure that the "Year, month, date, hour, and minute" are matched. For the present time confirmation, refer to "Maintenance Tool '2.18 Setting BMC LAN Information (bmcctl)' (MNTT 02-1210)".
If they are not matched, write down the present time on the node of not replaced, and set the time again with the timeset command for the node that executed the replacement. Rebooting is required after the time setting. For the setting of the present time, refer to "Maintenance Tool '2.43 Time Setting (timeset)' (MNTT 02-2470)".

(16) After completion of step (15), check the following.
Check the hardware statuses on the both nodes to confirm that both the "status" and "connection" of "BMC Information" in the window are "ok". (For checking the hardware status, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

NOTE:• If under the recovery of the dual failure, confirm that the "status" in "BMC Information" of the motherboard replaced node shows "ok".

Refer to 'B.2.9 Other Setting/Confirmation Items (1) Confirmation of the setting of Hyper-threading' and confirm that the setting of Hyper-threading is [Disabled].

If the operation instruction to remove heartbeat cable and management cable has been given in the Troubleshooting / Troubleshooting by each Model of this manual prior to the execution of the replacement procedure, return to the part replacement section of the Troubleshooting instead of proceeding to the step (17).

(17) Return to the step (e) of "Replacement '1.2.1 Parts replacement only when the node is turned off (cluster configuration)' (REP 01-0070)", and execute the rest of the procedures.

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D.1.9.2 Replacing the Motherboard (single node configuration)

(1) The replacement of the motherboard requires confirming and resetting the BMC. Therefore, confirm the BMC setting information, and write down the setting information. For the confirmation of the BMC setting, execute bmcctl command. If you cannot log in to the node, ask the system administrator.
For more information about bmcctl command, refer to "Maintenance Tool '2.18 Setting BMC LAN Information (bmcctl)' (MNTT 02-1210)".

(2) Stop the OS on the target node.
Before stopping the OS of the node, ask the system administrator if the service can be stopped or not. After confirming that, execute the operation.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(3) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(4) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the motherboard.
After replacing it, reconnect all the cables except for network cables.

NOTE: Precautions for parts replacement
- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the motherboard.
- After putting the node back to the rack, only reconnect the AC cable disconnected in step (3). Do not reconnect other external cables until an instruction is given.

(5) Open the remote console window.
For connecting the remote console, refer to 'B.1 Connection and Confirmation of OS Console.'

NOTE: On the motherboard of the maintenance parts, DHCP of BMC interface is enabled.
DHCP of BMC interface on the motherboard of the maintenance PC is enabled.
It takes one to two minutes until the default IP address (192.168.0.120) is set automatically after the power is supplied to the node in step (4).

(6) Confirm the BIOS version and the BMC Firmware Revision.
Refer to 'B.2 BIOS setting Table B.2-1 List of BIOS Setting Items of Motherboard 1'.
If the BIOS version and the BMC Firmware Revision are not the specified version or revision as the result of the confirmation, use the tool to change the version or revision. For the details, contact the Technical Support Center. After changing to the specified version or revision, perform the procedure from step (5) again.

(7) Change BMC network configuration.
Disable DHCP of IPv4. Also change BMC setting written down in step (1).
Also disable IPv6. For the details, refer to "QuantaGrid Series D51B-2U Technical Guide".

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(8) Confirm that an error of node is not displayed in Event Log and Sensor Readings using MegaRAC GUI. Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced. In this case, return to 'C.2.2.2 Failure determination procedure at the single node configuration' and determine the part to be replaced.

(9) Perform the settings of PSU2. For the details, refer to 'B.2.9 (2) Setting of Power supply unit'.

(10) Perform the BIOS setting of the motherboard. For the details, refer to 'B.2 BIOS setting Table B.2-1 List of BIOS Setting Items of Motherboard 2'.

(11) Reconnect all external cables disconnected before replacing the parts to the original locations. Press the power button on the node to turn on the power.

(12) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (13).
If the login prompt window is displayed, proceed to the step (13).

NOTE: Wait approximately 10 minutes until the OS is completely started.

(13) Check if the resource group is running normally.
Execute the rgstatus command to confirm whether the resource group is running normally. For the method for confirmation, refer to "Maintenance Tool '2.63 Resource group Status Display (rgstatus)' (MNTT 02-3380)".

(14) Check if the BMC interface setting is identical with the setting information recorded in the procedure (1). If the setting is different, reconfigure the setting by the information recorded in the procedure (1).
For the BMC interface setting, refer to "Maintenance Tool '2.18 Setting BMC LAN Information (bmcctl)' (MNTT 02-1210)".

(15) After completion of step (14), check the following.
Check the hardware statuses on the both nodes to confirm that both "status" of "BMC Information" in the window are "ok". (For checking the hardware status, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

(16) Refer to 'B.2.9 Other Setting/Confirmation Items (1) Confirmation of the setting of Hyper-threading' and confirm that the setting of Hyper-threading is [Disabled].

(17) Collect the OS log of the node.
For the details about OS collection, refer to "Maintenance Tool '2.19 Collecting Logs (oslogget)' (MNTT 02-1300)".

(18) Return to the step (c) of "Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)' (REP 01-0090)" and execute the rest of the procedures.

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D.1.10 Replacing the DVD Drive

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D.1.11 Replacing the CPU

For the cluster configuration, refer to D.1.11.1 Replacing the CPU (cluster configuration).
For the single node configuration, refer to ‘D.1.11.2 Replacing the CPU (single node configuration)’.

D.1.11.1 Replacing the CPU (cluster configuration)

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to “Maintenance Tool ‘2.28 Terminating the OS of This Side Node (nasshutdown)’ (MNTT 02-1740)”.

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to “QuantaGrid Series D51B-2U Technical Guide” and replace the CPU.

NOTE: Precautions for parts replacement
- In accordance with the description in “QuantaGrid Series D51B-2U Technical Guide”, replace the CPU. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to ‘C.2.2.1 Failure determination procedure at the cluster configuration’ and determine the part to be replaced.

(4) Connect all the cables to the node.
After replacing the CPU, reconnect the cables to the original position if they were removed before replacing, and press the power button on the node.

NOTE: When there has been an instruction to let the heartbeat cable and maintenance port cable removed during operation before executing the replacement procedure, do not connect heartbeat cable and the maintenance port cable and just connect the other cables.

(5) Confirm that the OS startup of the node is complete.
Refer to “Set Up ‘1.3 Startup Confirmation of the OS by using KVM’ (SETUP 01-0010)” and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to ‘C.2.4 Diagnosis for OS Boot Failure’ and execute the solution to the failure. After the failure is solved, proceed to the step (6).
If the login prompt window is displayed, proceed to the step (6).

NOTE: Wait approximately 10 minutes until the OS is completely started.

(6) Confirm the status of the other node.
Execute the peerstatus command on the other (normal) node to check whether the status is [BOOT COMPLETE]. For details about how to check node status, refer to “Maintenance Tool ‘2.36 Displaying the Status of Other Side Node (peerstatus)’ (MNTT 02-2130)”.

(7) Return to the step (e) of “Replacement ‘1.2.1 Parts replacement only when the node is turned off (cluster configuration)’ (REP 01-0070)” and execute the rest of the procedures.

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D.1.11.2 Replacing the CPU (single node configuration)

(1) Stop the OS on the target node.
Before stopping the OS of the node, ask the system administrator if the service can be stopped or not. After that confirmation, execute the operation.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the CPU.

NOTE: Precautions for parts replacement

- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the CPU. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.2 Failure determination procedure at the single node configuration' and determine the part to be replaced.

(4) After replacing the CPU, reconnect all the cables to the original position if they were removed before replacing, and press the power button on the node.

(5) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (6).
If the login prompt window is displayed, proceed to the step (6).

NOTE: Wait approximately 10 minutes until the OS is completely started.

(6) Check if the resource group is running normally.
Execute the rgstatus command to confirm whether the resource group is running normally. For the method for confirmation, refer to "Maintenance Tool '2.63 Resource group Status Display (rgstatus)' (MNTT 02-3380)".

(7) Return to the step (c) of "Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)' (REP 01-0090)" and execute the rest of the procedures.

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D.1.12 Replacing the HDD Backplane Board

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D.1.13 Replacing the Front Panel Board

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D.1.14 Replacing the PS Backboard

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D.1.15 Replacing the Lithium Battery

For the cluster configuration, refer to D.1.15.1 Replacing the Lithium Battery (cluster configuration).
For the single node configuration, refer to 'D.1.15.2 Replacing the Lithium Battery (single node configuration)'.

D.1.15.1 Replacing the Lithium Battery (cluster configuration)

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Replace the Lithium Battery. For the details, contact the Technical Support Center.

NOTE:
- When replacing Lithium Battery, put the node back to the rack after removing Fibre Channel Card. Install Fibre Channel Card again after setting BIOS.
  For how to remove Fibre Channel Card, refer to "QuantaGrid Series D51B-2U Technical Guide".
- After putting the node back to the rack, only reconnect the AC cable disconnected in step (2).
  Do not reconnect other external cables until an instruction is given.

(4) Perform the BIOS setting of the motherboard. For the details, refer to 'B.2 BIOS setting Table B.2-1 List of BIOS Setting Items of Motherboard 2'.

(5) Install Fibre Channel Card.
For how to install Fibre Channel Card, refer to "QuantaGrid Series D51B-2U Technical Guide".

(6) Confirm that an error of node is not displayed in Event Log and Sensor Readings using MegaRAC GUI.
Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
In this case, return to 'C.2.2.2 Failure determination procedure at the single node configuration' and determine the part to be replaced.

(7) Reconnect all external cables disconnected before replacing the parts to the original locations. Press the power button on the node to turn on the power.

NOTE: When there has been an instruction to let the heartbeat cable and maintenance port cable removed during operation before executing the replacement procedure, do not connect heartbeat cable and the maintenance port cable and just connect the other cables.

(8) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (9).
If the login prompt window is displayed, proceed to the step (9).

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(9) Confirm the node status on the other side.
To check, execute the peerstatus command on the other (normal) node and check whether the status is [BOOT COMPLETE].
For details about how to check node status, refer to "Maintenance Tool '2.36 Displaying the Status of Other Side Node (peerstatus)' (MNTT 02-2130)".

NOTE: Wait approximately 10 minutes until the OS is completely started.

(10) Confirm the time of the node.
Execute the timeget command in the both node with no option specifying, and check that the present time matches in the both nodes. For the confirmation of the present time, make sure that the "Year, month, date, hour, and minute" are matched. For the present time confirmation, refer to "Maintenance Tool '2.42 Acquisition of Time/ Time Zone (timeget)' (MNTT 02-2430)".
If they are not matched, write down the present time on the node of not replaced, and set the time again with the timeset command for the node that executed the replacement. Rebooting is required after the time setting. For the setting of the present time, refer to "Maintenance Tool '2.43 Time Setting (timeset)' (MNTT 02-2470)".

(11) Confirm the settings of Hyper-threading.
Refer to 'B.2.9 Other Setting/Confirmation Items (1) Confirming the Hyper-threading settings' to confirm that the setting of Hyper-threading is disabled.

(12) Return to the step (e) of "Replacement '1.2.1 Parts replacement only when the node is turned off (cluster configuration)' (REP 01-0070)" and execute the rest of the procedures.

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D.1.15.2 Replacing the Lithium Battery (single node configuration)

(1) Stop the OS on the target node.
Before stopping the OS of the node, ask the system administrator if the service can be stopped or not. After that confirmation, execute the operation.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Replace the Lithium Battery. For the details, contact the Technical Support Center.

(4) After replacing the Lithium Battery, reconnect the cables where they were if they are all removed at the replacing operation, and press the power button on the node.

(5) Perform the BIOS setting of the motherboard. For the details, refer to 'B.2 BIOS setting Table B.2-1 List of BIOS Setting Items of Motherboard 2'.

(6) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (7).
If the login prompt window is displayed, proceed to the step (7).

NOTE: Wait approximately 10 minutes until the OS is completely started.

(7) Confirm the settings of Hyper-threading.
Refer to 'B.2.9 Other Setting/Confirmation Items (1) Confirming the Hyper-threading settings' to confirm that the setting of Hyper-threading is disabled.

(8) Check if the resource group is running normally.
Execute the rgstatus command to confirm whether the resource group is running normally. For the method for confirmation, refer to "Maintenance Tool '2.63 Resource group Status Display (rgstatus)' (MNTT 02-3380)".

(9) Return to the step (c) of "Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)' (REP 01-0090)" and execute the rest of the procedures.

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D.1.16 Replacing the PCI Riser Board

For the cluster configuration, refer to D.1.16.1 Replacing the Lithium Battery (cluster configuration).
For the single node configuration, refer to 'D.1.16.2 Replacing the PCI Riser Board (single node configuration)'.

D.1.16.1 Replacing the PCI Riser Board (cluster configuration)

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the PCI Riser Board.

NOTE: Precautions for parts replacement

- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the PCI Riser Board. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Two types of PCI Riser Board are available. "QuantaGrid Series D51B-2U Technical Guide" describes only one replacement procedure. If the procedure of the failed PCI Riser Board is different from the one described in "QuantaGrid Series D51B-2U Technical Guide", replace PCI Riser Board by using the described procedure as a guide.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.1 Failure determination procedure at the cluster configuration' and determine the subject parts.

(4) After replacing the PCI Riser Board, reconnect the cables where they were if they are all removed at the replacing operation, and press the power button on the node.

NOTE: When there has been an instruction to let the heartbeat cable and maintenance port cable removed during operation before executing the replacement procedure, do not connect heartbeat cable and the maintenance port cable and just connect the other cables.

(5) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (6).
If the login prompt window is displayed, proceed to the step (6).

(6) Confirm the node status on the other side.
To check, execute the peerstatus command on the other (normal) node and check whether the status is [BOOT COMPLETE].
For details about how to check node status, refer to "Maintenance Tool '2.36 Displaying the Status of Other Side Node (peerstatus)' (MNTT 02-2130)".

NOTE: Wait approximately 10 minutes until the OS is completely started.

(7) Return to the step (e) of "Replacement '1.2.1 Parts replacement only when the node is turned off (cluster configuration)' (REP 01-0070)" and execute the rest of the procedures.

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D.1.16.2 Replacing the PCI Riser Board (single node configuration)

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the PCI Riser Board.

NOTE: Precautions for parts replacement

- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the PCI Riser Board. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Two types of PCI Riser Board are available. "QuantaGrid Series D51B-2U Technical Guide" describes only one replacement procedure. If the procedure of the failed PCI Riser Board is different from the one described in "QuantaGrid Series D51B-2U Technical Guide", replace PCI Riser Board by using the described procedure as a guide.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.2 Failure determination procedure at the single node configuration' and determine the subject parts.

(4) After replacing the PCI Riser Board, reconnect the cables where they were if they are all removed at the replacing operation, and press the power button on the node.

(5) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (6).
If the login prompt window is displayed, proceed to the step (6).

NOTE: Wait approximately 10 minutes until the OS is completely started.

(6) Check if the resource group is running normally.
Execute the rgstatus command to confirm whether the resource group is running normally. For the method for confirmation, refer to "Maintenance Tool '2.63 Resource group Status Display (rgstatus)' (MNTT 02-3380)".

(7) Return to the step (c) of "Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)' (REP 01-0090)" and execute the rest of the procedures.

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D.1.17 Replacing the CPU Heatsink

For the cluster configuration, refer to D.1.17.1 Replacing the CPU Heatsink (cluster configuration).
For the single node configuration, refer to 'D.1.17.2 Replacing the CPU Heatsink (single node configuration)'.

D.1.17.1 Replacing the CPU Heatsink (cluster configuration)

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the CPU Heatsink.

NOTE: Precautions for parts replacement
- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the CPU Heatsink. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.1 Failure determination procedure at the cluster configuration' and determine the part to be replaced.

(4) After replacing the CPU Heatsink, reconnect the cables to the original position if they were removed before replacing, and press the power button on the node.

NOTE: When there has been an instruction to let the heartbeat cable and maintenance port cable removed during operation before executing the replacement procedure, do not connect heartbeat cable and the maintenance port cable and just connect the other cables.

(5) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (6).
If the login prompt window is displayed, proceed to the step (6).

(6) Check whether the OS is completely started on the node. To check, execute the peerstatus command on the other (normal) node and check whether the status is [BOOT COMPLETE].
For details about how to check node status, refer to "Maintenance Tool '2.36 Displaying the Status of Other Side Node (peerstatus)' (MNTT 02-2130)".

NOTE: Wait approximately 10 minutes until the OS is completely started.

(7) Return to the step (e) of "Replacement '1.2.1 Parts replacement only when the node is turned off (cluster configuration)' (REP 01-0070)" and execute the rest of the procedures.

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D.1.17.2 Replacing the CPU Heatsink (single node configuration)

(1) Stop the OS on the target node.
Before stopping the OS of the node, ask the system administrator if the service can be stopped or not. After that confirmation, execute the operation.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the CPU Heatsink.

NOTE: Precautions for parts replacement

- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the CPU Heatsink. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.2 Failure determination procedure at the single node configuration' and determine the part to be replaced.

(4) After replacing the CPU Heatsink, reconnect all the cables to the original position if they were removed before replacing, and press the power button on the node.

(5) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (6).
If the login prompt window is displayed, proceed to the step (6).

NOTE: Wait approximately 10 minutes until the OS is completely started.

(6) Check if the resource group is running normally.
Execute the rgstatus command to confirm whether the resource group is running normally. For the method for confirmation, refer to "Maintenance Tool '2.63 Resource group Status Display (rgstatus)' (MNTT 02-3380)".

(7) Return to the step (c) of "Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)' (REP 01-0090)" and execute the rest of the procedures.

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D.1.18 Replacing the CPU Air Duct

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D.1.19 Replacing the Cable

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D.1.20 Replacing the BMC

Refer to ‘D.1.9 Replacing the Motherboard’, and execute the replacement of the motherboard.

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D.1.21 Replacing the Management Port

Refer to ‘D.1.9 Replacing the Motherboard’, and execute the replacement of the motherboard.

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D.1.22 Replacing the Internal RAID Battery

Replace the SuperCap.

For the cluster configuration, refer to D.1.22.1 Replacing the Internal RAID Battery (cluster configuration).
For the single node configuration, refer to 'D.1.22.2 Replacing the Internal RAID Battery (single node configuration)'.

D.1.22.1 Replacing the Internal RAID Battery (cluster configuration)

This is not a part to be replaced.

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D.1.22.2 Replacing the Internal RAID Battery (single node configuration)

(1) Stop the OS on the target node.
Before stopping the OS of the node, ask the system administrator if the service can be stopped or not. After that confirmation, execute the operation.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect all the external cables connected to the node.
Write down the connecting point of the cables to reconnect them after parts replacement.

(3) Refer to "QuantaGrid Series D51B-2U Technical Guide" and replace the SuperCap.

NOTE: Precautions for parts replacement
- In accordance with the description in "QuantaGrid Series D51B-2U Technical Guide", replace the SuperCap. Also confirm that a node error is not indicated in Event Log and Sensor Readings using MegaRAC GUI.
- Depending on the confirmation result of Event Log and Sensor Readings, other parts might be replaced.
  In this case, return to 'C.2.2.2 Failure determination procedure at the single node configuration' and determine the part to be replaced.

(4) After replacing the SuperCap, reconnect all the cables to the original position if they were removed before replacing, and press the power button on the node.

(5) Confirm that the OS startup of the node is complete.
Refer to "Set Up '1.3 Startup Confirmation of the OS by using KVM' (SETUP 01-0010)" and confirm that the login prompt window is displayed.
If the login prompt window is not displayed and a boot failure window is displayed, the OS startup was not successful because another failure occurred. Refer to 'C.2.4 Diagnosis for OS Boot Failure' and execute the solution to the failure. After the failure is solved, proceed to the step (6).
If the login prompt window is displayed, proceed to the step (6).

NOTE: Wait approximately 10 minutes until the OS is completely started.

(6) Check whether one of following SIM message is displayed. (Refer to "Maintenance Tool '2.6 Displaying SIMs on This Side (syseventlist)' (MNTT 02-0360)".)
- "KAQK37523-I Information regarding the internal RAID battery was detected. (time = -, code = 0x000000f2, content = Battery charge complete)"

(7) Check if the resource group is running normally.
Execute the rgstatus command to confirm whether the resource group is running normally. For the method for confirmation, refer to "Maintenance Tool '2.63 Resource group Status Display (rgstatus)' (MNTT 02-3380)".

(8) Return to the step (c) of "Replacement '1.2.2 Parts replacement only when the node is turned off (single node configuration)' (REP 01-0090)" and execute the rest of the procedures.

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D.1.23 Replacing the USB Board

This is not a part to be replaced.

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D.1.24 Replacing the SFP module

For the cluster configuration, refer to D.1.24.1 Replacing the SFP module (cluster configuration).
For the single node configuration, refer to ‘D.1.24.2 Replacing the SFP module (single node configuration)’.

D.1.24.1 Replacing the SFP module (cluster configuration)

NOTE: SFP modules for 10GbE-2Port card are the target.

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to “Maintenance Tool ‘2.28 Terminating the OS of This Side Node (nasshutdown)’ (MNTT 02-1740)”.

(2) Disconnect optical cables from all of the SFP modules to be replaced.

NOTE: Perform marking or take other measures so as to reconnect the cables properly.

(3) Replace the SFP module. For the details, contact the Technical Support Center.

(4) Reconnect the cables that have been disconnected in step (2).

NOTE: If a FC-SW is used, port zoning might be applied, so make sure that the cables are connected to the appropriate ports.

(5) Turn the power button on.
Log in the node from the maintenance PC after the OS is started up. Normally it takes approximately 10 minutes until the startup of the OS is complete.
Refer to “Maintenance Tool ‘1.3.2 Logging in to a node for executing commands’ (MNTT 01-0200)” for logging in.

(6) Verify that the port of the installed SFP module is in the link-up state by mean of the LED indication on the SFP module. For the details of LED, contact the Technical Support Center.

(7) Execute the hwstatus command. For the details of the hwstatus command, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus)’.
If the status of the parts replaced port is “down”, confirm cable connection (erroneous wiring and connecting condition) again.

(8) Return to the step (e) of “Replacement ‘1.2.1 Parts replacement only when the node is turned off (cluster configuration)’ (REP 01-0070)” and execute the rest of the procedures.

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D.1.24.2 Replacing the SFP module (single node configuration)

NOTE: SFP modules for 10GbE-2Port card are the target.

(1) Stop the OS on the target node.
For details about how to stop the OS on a node, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(2) Disconnect optical cables from all of the SFP modules to be replaced.

NOTE: Perform marking or take other measures so as to reconnect the cables properly.

(3) Replace the SFP module. For the details, contact the Technical Support Center.

(4) Reconnect the cables that have been disconnected in step (2).

(5) Turn the power button on.
Log in the node from the maintenance PC after the OS is started up. Normally it takes approximately 10 minutes until the start up of the OS is complete.
Refer to "Maintenance Tool '1.3.2 Logging in to a node for executing commands' (MNTT 01-0200)" for logging in.

(6) Verify that the port of the installed SFP module is in the link-up state by mean of the LED indication on the SFP module. For the details of LED, contact the Technical Support Center.

(7) Execute the hwstatus command. For the details of the hwstatus command, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.
If the status of the parts replaced port is "down", confirm cable connection (erroneous wiring and connecting condition) again.

(8) Return to the step (e) of "Replacement '1.2.1 Parts replacement only when the node is turned off (cluster configuration)' (REP 01-0070)" and execute the rest of the procedures.

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D.2 Appendix.A A Node Replacement Procedure

The following are the procedures to replace the previous node of Hitachi Data Ingestor with the new node in a locale.

In the case of the cluster configuration, an operation is continued on the other side of the node because one side performs failover to operate.

In the case of the single node configuration, an operation cannot be continued. Confirm with the customer for the replacement schedule to perform the node replacement.

Table D.2-1 shows the definition of terms used in this chapter.

Table D.2-1 Definition of Terms

#	Term	Meaning
1	the previous node	Node which operation is already running Node to be removed from the rack
2	the new node	Node which to be run operation newly Node to be mounted on the rack
3	the other side node	Node not to be replaced in the cluster configuration (#1). The other side of the node that the operation is continued.

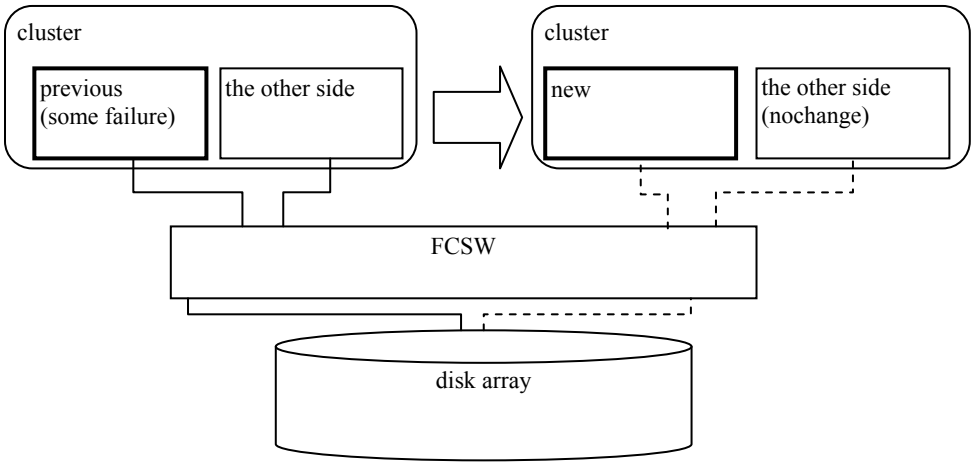

Figure D.2-1 Image of Node Replacement in the Cluster Configuration

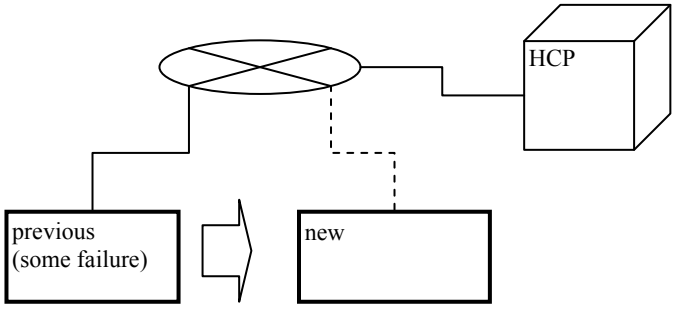

Figure D.2-2 Image of Node Replacement in the Single Node Configuration

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D.2.1 Replacing One Side of the Node in the Cluster Configuration

Table D.2.1-1 shows an outline of the work procedure of node replacement.

Table D.2.1-1 Outline of the Work Procedure

#	Operator		Device to be worked	Work description	Reference
	System administrator	Maintenance personnel			
1				Schedule the node replacement.	‘D.2.1.1 Prerequisites of the Replacement Work’
2				Request to ship the node that is the same configuration as the previous node in operation.	
3	—	☑	the previous node the other side node	Confirm the each setting information. (OS version, BIOS version, Firmware Version,…)	‘D.2.1.2 Preparation for the previous node replacement’
4	☑	—		Confirm that the system setting information is acquired.	
5	☑	☑		Confirm that the node to be replaced is failover.	
6	☑	☑		Confirm that the node to be replaced is stopped.	
7	—	☑		Stop the power of the node to be replaced.	
8	—	☑		Remove cables of the node to be replaced.	
9	—	☑		Take down the node to be replaced from the rack.	
10	—	☑	the new node	Mount the new node on the rack.	‘D.2.1.3 Mounting the New Node and Preparing Settings’
11	—	☑		Connect power cables.	
12	—	☑		Turn on power.	
13	—	☑		Confirm the OS version.	
14	—	☑		Confirm the hardware configuration.	
15	—	☑		Confirm the security mode and the WWN setting. Set in the array system.	
16	☑	☑		Perform the OS installation.	
17	—	☑		Connect LAN cables and Fibre Channel cables.	
18	—	☑	the new node	Check setting information of the new node. (Confirm that BIOS version, BMC F/W version, BMC information and the shared LU are visible.)	‘D.2.1.4 Confirming setting information of the new node’
19	—	☑		Set time for the new node.	
20	☑	☑		Start the replaced node.	
21	☑	—		Reflect system setting information into the node.	‘D.2.1.5 Reflecting system setting information of the previous node into the new node’
22	☑	☑		Perform the failback to the replaced node.	‘D.2.1.6 Confirming resource groups’
23	☑	☑		Confirm the completion of the failback (confirm the status of the resource group).	
24	☑	—		Confirm I/O of user data.	‘D.2.1.7 Confirming access to user data’
25	—	☑		Check the setting and connection of the HiTrack.	None

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D.2.1.1 Prerequisites of the Replacement Work

The following are the prerequisites for node replacement. A work plan must fulfill the following conditions.

- The new node must have the same model and the hardware configuration as the previous node.
- The BIOS setting for the new node is completed at the shipment.
- To reflect system setting information of the previous node into the new node, the new node has the same OS version of the previous node.
- The procedure is not supported to replace parts such as memory boards or fans between the new node and previous node.
- The configuration of BMC connection to reset the other side node consists of the BMC and management SW connection configuration and BMC direct connection configuration. However, this work does not change the connection configuration. If the configuration change is required, perform it after completing the node replacement.
- Confirm with the system administrator that the system setting information is backed up.

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D.2.1.2 Preparation for the previous node replacement

(1) Confirm the setting information of the previous node from the other side of the node.
Execute a command to the other side node to output setting information to a file. Then, transfer the output file to the Maintenance PC.

(a) Check the OS version.
Refer to "Maintenance Tool '2.34 Displaying the Version of the OS (versionlist)' (MNTT 02-2060)" to confirm the OS version of the other side node.

(b) When the setting of host group security mode is enabled, changing of WWN is required after the parts replacement. Therefore, take notes for WWN corresponding to the both FC ports installed in the previous node. When the setting of host group security mode is disabled, go to Step (c).
If BIOS starts up on the previous node, check the setting in the BIOS window. Refer to 'B.5.1 Acquiring WWNs of Nodes' to check WWN and record it.
If BIOS does not start up on the previous node, confirm with the customer for the setting of the previous node.

(c) Execute "sudo bmcctl" to the other side node, and record the interface information of "bmc".
For the bmcctl command, refer to "Maintenance Tool '2.18 Setting BMC LAN Information (bmcctl)' (MNTT 02-1210)".

(d) Run "sudo hwstatus" on the other side node and check and record the hardware configuration of the other side node.
For the hwstatus command, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

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(2) Confirm with the system administrator that the system setting information is backed up.

(3) Confirm the resource group status of the previous node.
Confirm with the system administrator for the resource group status, and then turn off the power.

(a) Confirm with the system administrator that the failover of the resource group on the previous node is complete. If the failover is not performed, ask the system administrator to perform the failover. However, if the system administrator is in absent, contact the system administrator to get an approval of the above operation, and then the maintenance personnel perform it. For how to perform the operations, refer to "Maintenance Tool '3.1 Failover and Node Termination Execute the OS stop or the OS reboot' (MNTT 03-0000)".

(b) Execute "sudo nasshutdown" at "the previous node" to stop the OS of the node.
For the nasshutdown command, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(4) Removing cables

NOTE: When removing LAN cables and FC cables, take some measures like labeling so that the ports to which the cables were connected can be judged.

(a) Request the system administrator to remove the LAN cable connected to the data port of the previous node.

(b) Remove the LAN cable connected to the management port, heart beat port, and maintenance port of the previous node, and the FC cable connected to the FC port of the previous node.

(5) Removing the previous node
Get down the previous node from the rack.

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D.2.1.3 Mounting the New Node and Preparing Settings

(1) Mount the new node on the rack.
Put the rack rail on the new node and mount the new node on the rack.

(2) Connect the power cable to "the new node".
For the place to connect the power cables, refer to 'A.2.2 Back side'.

(3) Turn on power of the new node.
For how to turn on power, refer to "Installation '2.1.1 Procedure for turning on the power' (INST 02-0000)".

(4) Confirming OS version of the new node
Check the OS version of the new node, and the other side node.
Refer to "Maintenance Tool '2.34 Displaying the Version of the OS (versionlist)' (MNTT 02-2060)" to confirm the OS version of the node.

(5) Confirm that the hardware configuration of the new node and the previous node is the same.
Run the hwstatus command on the new node and compare with the result of hardware configuration of the other side node (acquired in 'D.2.1.2 (1) (d)') to confirm that the items except "Serial Number Information" and the network status (up/down) are identical. For the hwstatus command, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.
If the hardware configuration is different, contact the Technical Support Center.

(6) When the setting of host group security mode is enabled, take notes for WWN of the new node. When the setting of host group security mode is disabled, go to step (7).

The following two types of WWN acquisition methods are available.
- Determine from [FC Port Information] of the hwstatus command.
  For the hwstatus command, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.
- Confirm by BIOS.
  Refer to 'B.5.1 Acquiring WWNs of Nodes' to confirm WWN.

(7) When connecting AMS2000 series/HUS100 series, refer to "LUN Manager User's Guide" of AMS2000 series/HUS100 series, when connecting USP V/USP VM/VSP/VSP G1000/HUS VM, refer to "INSTALLATION SECTION '5.3.1.4. LUN Management'" in each maintenance manual, and for VSP Gx00, refer to "System Administrator Guide" to change WWN registered in the connection port on the disk array subsystem.
To change WWN, delete the WWN number noted in 'D.2.1.2 (1) (b)' and replace with the WWN number recorded in step (6).

(8) After completion of step (7), if the FC-SW is not used, skip this step.
If the FC-SW is used, request the system administrator to change the FC-SW WWN zoning by deleting the WWN that you took a note of in step (x:new node's wwn) and registering the WWN that you took a note of "the previous node".

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(9) Install the OS in the new node.
Compare the OS versions between the other side node (acquired in ‘D.2.1.2 (1) (a)’) and the new node (acquired in ‘D.2.1.3 (4)’).

(a) If the OS version installed in the new node is older than the OS version installed in the other side node, go to step (b).
If the OS version installed in the new node is newer than the OS version installed in the other side node, suspend the operation and contact the Technical Support Center.
If the OS version installed in the other side node and the new node is same, go to step (10).

(b) Perform the update installation of the OS in the new node.
Refer to “Set Up ‘Chapter 2.3 Overview of Update Installation’ (SETUP 02-0040)” to confirm settings after the update installation.

(10) Connect LAN cables and Fibre Channel cables

(a) Request the system administrator to connect the LAN cable to the data port of the new node.

(b) Connect the LAN cable to the management port, heart beat port, BMC port and maintenance port of the new node. Also, connect the FC cable to the FC port.
Refer to ‘A.2.2.2 Port arrangement and port names’.

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D.2.1.4 Confirming setting information of the new node

Before reflecting the setting of the previous node into the new node, check setting information of the new node.

(1) Turn on power of the new node.
For how to turn on power, refer to "Installation '2.1.1 Procedure for turning on the power' (INST 02-0000)".

(2) Confirm the BIOS version of the new node and record it as a work memo.
For how to confirm, refer to 'B.2.1 BIOS Version Checking Procedure'.As the result of the confirmation, if the BIOS version is not the specified version, apply the appropriate version using the tool that changes the version. For the details, contact the Technical Support Center.

(3) Confirm the BMC firmware version of the new node and record it as a work memo.
For how to confirm, refer to 'B.2.2 BMC Firmware Version Checking Procedure'.
As the result of the confirmation, if the BIOS version is not the specified version, apply the appropriate version using the tool that changes the version. For the details, contact the Technical Support Center.

(4) Execute "sudo bmcctl" at the new node to confirm BMC interface information.
Compare the setting information with information of the previous node.
When the settings are different, set information of the previous node.
For BMC interface information, refer to "Maintenance Tool '2.18 Setting BMC LAN Information (bmcctl)' (MNTT 02-1210)".

(5) Execute "sudo hwstatus" at the new node to confirm the hardware status.
Confirm if hardware output results (Fan Information, Temperature Information, Power Supply Information, Memory Information, and Internal HDD Information) are "ok" or "installed".
For the hwstatus command, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

(6) Execute "sudo hwstatus" at the new node to confirm the BMC connection status.
Confirm "status" of "BMC information" displayed on screen is "ok" and "connection" is "none".
For the hwstatus command, refer to 'B.3.1 Displaying the Hardware Status (hwstatus)'.

(7) Execute "sudo fchabafwlist", and record the version of the Fibre Channel HBA firmware.
For the fchbafwlist command, refer to "Maintenance Tool '2.24 Checking the HBA Firmware Version (fchbafwlist)' (MNTT 02-1600)".
As the result of the confirmation, if the BIOS version is not the specified version, apply the appropriate version using the tool that changes the version. For the details, contact the Technical Support Center.

(8) Refer to the time of the previous node configured in the Maintenance PC and execute the timeset command to set time of the new node..
For setting time, refer to "Maintenance Tool '2.43 Time Setting (timeset)' (MNTT 02-2470)".

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D.2.1.5 Reflecting system setting information of the previous node into the new node

Execute syslurestore command, and restore the system LU. Refer to "Maintenance Tool '2.8 Recovering the Disk/Cluster Management LU (syslurestore)'(MNTT 02-0460)," and execute the OS restoration.

D.2.1.6 Confirming resource groups

Confirm the failback and the completion of the failback (status confirmation of the resource group).

(1) Ask the system administrator to change the "Node Status" of the new node to "UP" to perform failback the failover resource group to the new node.
However, if the system administrator is in absent, contact the system administrator to get an approval of the above operation, and then the maintenance personnel perform it. For how to perform the operations, refer to "Maintenance Tool '3.2 Failback and Start of Node after Starting the OS' (MNTT 03-0030)".

(2) Run the clstatus command to confirm that the "Node status" of the both nodes is "UP" and the "Resource Group Status" of the both nodes is "(Online/No Error)".
For the clstatus command, refer to "Maintenance Tool '2.2 Displaying the Cluster Status (clstatus)' (MNTT 02-0040)".

(3) Execute "sudo syseventlist" at the new node to confirm if a failure SIM is not shown.
For the syseventlist command, refer to "Maintenance Tool '2.6 Displaying SIMs on This Side (syseventlist)' (MNTT 02-0360)".

D.2.1.7 Confirming access to user data

Request the system administrator to confirm clusters, resource group status, and access from the client to user data.

NOTE: Check the setting and connection of the HiTrack.

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D.2.2 Replacing the Node in the Single Node Configuration

Table 2.2-1 shows an outline of the work procedure of node replacement.

Table 2.2-1 Outline of the Work Procedure

#	Operator		Device to be worked	Work description	Reference
	System administrator	Maintenance personnel			
1				Schedule the node replacement.	‘D.2.2.1 Prerequisites of the Replacement Work’
2				Request to ship the node that is the same configuration as the previous node in operation.	
3	—	☑	the previous node	Collect setting information (network interface information, BMC information, system time, OS version…).	‘D.2.2.2 Preparation for the previous node replacement’
4	☑	—		Confirm that the system setting information and user data are backed up in HCP.	
5	☑	—		Confirm that the node to be replaced is stopped.	
6	—	☑		Stop the power supply.	
7	☑	☑		Remove cables.	
8	☑	☑		Remove the node.	
9	☑	☑	the new node	Mount on the rack.	‘D.2.2.3 Mounting the New Node and Preparing Settings’
10	☑	☑		Install the node.	
11	☑	☑		Connect power cables.	
12	—	☑		Turn on power.	
13	—	☑		Confirm the OS version.	
14	—	☑		Confirm that the new node has the same hardware configuration as the previous node.	
15	—	☑		Install the OS.	
16	—	☑		Connect LAN cables.	
17	—	☑	the new node	Check setting information of the new node. (BIOS version, BMC F/W version, BMC information)	‘D.2.2.4 Confirming setting information of the new node’
18	—	☑		Set time for the new node.	
19	☑	—		Reflect system setting information and user data into the node (from HCP).	‘D.2.2.5 Reflecting system setting information of the previous node into the new node’
20	☑	—		Start up the resource group to confirm the status.	‘D.2.2.6 Confirming resource groups by the maintenance personnel’
22	☑	☑		Confirm I/O of user data.	‘D.2.2.7 Confirming access to user data’
23	☑	—		Check the setting and connection of the HiTrack.	None

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D.2.2.1 Prerequisites of the Replacement Work

The following are the prerequisites for node replacement. A work plan must fulfill the following conditions.

- The system operation is stopped before starting this work. No access to user data is allowed until this work is completed.
- The new node must have the same model and the hardware configuration as the previous node.
- The OS version supports both the new and previous node.
- The BIOS setting for the new node is completed at the shipment.
- Network information of the maintenance port and management port of the new mode at the shipment is the same setting as the previous node.
- To restore system setting information of the previous node into the new node, the new node has the same or later OS version of the previous node.
- To save system setting information, “Node status” of the previous node is “UP” and “Resource group status” is “Online/No error” or “Offline/No error”.
- Confirm with the system administrator that the system setting information and the user data are backed up in HCP.

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D.2.2.2 Preparation for the previous node replacement

(1) Acquiring setting information of the previous node.

(a) Check the OS version of the previous node.
Confirm with the customer for the OS version installed in the previous node.

(b) Check the network information
Confirm with the customer for the information such as the maintenance port/management port/BMC port set in the previous node.

(c) Check the hardware information
Confirm with the customer for the hardware configuration of the previous node.

(2) Confirm with the system administrator that the system setting information and the user data are backed up.

(3) Check the resource group status of the previous node.
Confirm with the system administrator for the resource group status and turn off the power.
If the power is already turned off, go to Step (4).

(a) Execute "sudo rgstop *<resource group name>*" to stop the resource group. Stop resource groups.
For the rgstop command, refer to "Maintenance Tool '2.53 Stopping Resource group (rgstop)' (MNTT 02-2950)".

(b) Execute "sudo nasshutdown" to stop the OS of the node.
For the nasshutdown command, refer to "Maintenance Tool '2.28 Terminating the OS of This Side Node (nasshutdown)' (MNTT 02-1740)".

(4) Removing cables

NOTE: When removing LAN cables and FC cables, take some measures like labeling so that the ports to which the cables were connected can be judged.

(a) Request the system administrator to remove the LAN cable connected to the data port of the previous node.

(b) Remove the LAN cable connected to the management port, heart beat port, and maintenance port of the previous node.

(5) Removing the previous node
Get down the previous node from the rack.

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D.2.2.3 Mounting the New Node and Preparing Settings

(1) Mount the new node on the rack.

Put the rack rail on the new node and mount the new node on the rack.

(2) Connect the power cable to “the new node”.
For the place to connect the power cables, refer to “A.2.2 Back side”.

(3) Turn on power of the new node.
For how to turn on power, refer to “Installation ‘2.1.1 Procedure for turning on the power’ (INST 02-0000)”.

(4) Confirming OS version of the new node.
Check the OS version of the new node.
Refer to “Maintenance Tool ‘2.34 Displaying the Version of the OS (versionlist)’ (MNTT 02-2060)” to confirm the OS version of the node.

(5) Visually confirm that the hardware configuration of the new node and the previous node is the same.

(6) Install the OS in the new node.
Compare the OS versions between the previous node (acquired in ‘D.2.2.1 (1) (a)’) and the new node (acquired in ‘D.2.2.3 (4)’).

(a) If the OS version installed in the new node is older than the OS version installed in the previous node, go to Step (b).
If the OS version installed in the new node is newer than the OS version installed in the previous node, suspend the operation and contact the Technical Support Center.
If the OS version installed in the previous node and the new node is same, go to Step (7).

(b) Install the updated OS to the new node.
Refer to “Set Up ‘Chapter 2.3 Overview of Update Installation’ (SETUP 02-0040)” to confirm settings after the update installation.

(7) Connect LAN cables

(a) Request the system administrator to connect the LAN cable to the data port of the new node.

(b) Connect the LAN cable to the management port, heart beat port, BMC port and maintenance port of the new node.
Refer to ‘A.2.2.2 Port arrangement and port names’.

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D.2.2.4 Confirming setting information of the new node

Before reflecting the setting of the previous node into the new node, check setting information of the new node.

For the hwstatus command, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus)’.

(1) Turn on power.
For how to turn on power, refer to “Installation ‘2.1.1 Procedure for turning on the power’ (INST 02-0000)”.

(2) Confirm the BIOS version of the new node.
If the version is not the specified version as the result of the confirmation, use the tool to change the version.
For the details, contact the Technical Support Center.

(3) Confirm the BMC firmware version of the new node.
For how to confirm the BMC firmware version installed in the new node, refer to ‘B.2.2 BMC Firmware Version Checking Procedure’.
If the version is not the specified version as the result of the confirmation, use the tool to change the version.
For the details, contact the Technical Support Center.

(4) Execute “sudo bmcctl” to confirm BMC interface information.
Compare the setting information with “the previous node” information.
When the settings are different, set the same as “the previous node” settings.
For BMC interface information, refer to “Maintenance Tool ‘2.18 Setting BMC LAN Information (bmcctl)’ (MNTT 02-1210)”.

(5) Execute “sudo hwstatus” to confirm the hardware status.
Confirm if hardware output results (Fan Information, Temperature Information, Power Supply Information, Memory Information, and Internal HDD Information) are “ok” or “installed”.
For the hwstatus command, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus)’.

(6) Execute “sudo hwstatus” to confirm the BMC connection status.
Confirm “status” of “BMC information” displayed on screen is “ok” and “connection” is “none”.
For the hwstatus command, refer to ‘B.3.1 Displaying the Hardware Status (hwstatus)’.

(7) Refer to the time of the previous node configured in the Maintenance PC and execute the timeset command to set time.
For setting time, refer to “Maintenance Tool ‘2.43 Time Setting (timeset)’ (MNTT 02-2470)”.

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D.2.2.5 Reflecting system setting information of the previous node into the new node

Restore the recoveries of the system setting information and the user data from HCP collectively.

When the recovery is complete, OS reboots.

For the detailed procedure, refer to “Batch restoration of system configuration information and use data” in “Single Node Troubleshooting Guide” to perform.

In the command dialog and the procedure of the reference guide, perform the cluster redefinition, restoration of the encryption key and startup of the cluster/resource group. For the password and the path phrase prompted during the command dialog, enter the password and the path phrase prepared in “Troubleshooting ‘12.1.6 Preparing password and path phrase of HCP payload encryption function’ (TRBL 12-0191)”.

D.2.2.6 Confirming resource groups by the maintenance personnel

(1) Execute “sudo rgstatus” to confirm “Resource Group status” is “Online/No error”.
For the rgstatus command, refer to “Maintenance Tool ‘2.63 Resource group Status Display (rgstatus)’ (MNTT 02-3380)”.

(2) Execute “sudo syseventlist” to confirm if a failure SIM is not shown.
For the syseventlist command, refer to “Maintenance Tool ‘2.6 Displaying SIMs on This Side (syseventlist)’ (MNTT 02-0360)”.

D.2.2.7 Confirming access to user data

Request the system administrator to access from the client to user data.

NOTE: Check the setting and connection of the HiTrack.

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